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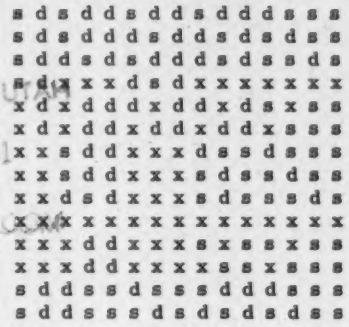

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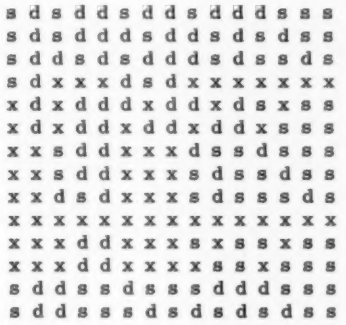

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INFORMATION AS A MEASURE OF STRUCTURE IN MUSIC

by

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When we wish to communicate by visual means, we draw a linear configuration whose structure is similar to that of the object or idea that we wish to represent. For example, we make a wavy line on a page to represent a snake, the surface of the ocean, the nature of a light ray, the rise and fall of emotional response, a principle of economics, or a cyclic concept of history. In every case, the wavy line serves as a reasonably satisfactory representation of the fact or idea to be conveyed because it demonstrates the most obvious structural property of that which it seeks to represent. The wavy line does not rely upon convention for its communicative effect. It relies solely upon its structural relevance to the fact or idea it is intended to convey.

The possibility of artistic communication by means of music relies also upon the structural relevance of the musical experience to the non-musical experiences that the music is intended to convey. If we are to successfully relate musical experience and general experience to provide a practical aesthetic of music, it must be through a careful definition of the structure of experience. Since musical experience is only a special case of general experience, an effective definition of structure in general experience would also be a definition of musical structure. It is only necessary to formulate this definition in terms which are independent of the elements generating the structure. This has not been accomplished to date in the case of music. Most descriptions of musical structure are couched in terms that make it impossible, except by means of vague and often misleading analogies, to relate musical structure to the structure of general experience. It is our intention to present here a method for measuring the structural properties of any experience, regardless of the specific elements that constitute the experience. We will then demonstrate some applications of this measure to problems of musical structure.

General experience at the lowest level consists of sense-data, those minute neurological responses of the individual human to the external world that are the units of perception. Through the continuing process of grouping these units in a variety of ways and combining them with new sense-data, the mind formulates and stores general concepts regarding experience. Concept formation, the abstraction of ideas from reality, relies upon the capability of the human mind to reduce the minutiae of any sensory experience to a skeleton consisting of only those units of experience which are essential to the recollection and identification of the experience. Our understanding of the natural world around us derives from any indications of structure that that

world suggests.

As an example of the above, we may take a single musical pitch sounded by an oboe. We say that we hear an "oboe A." This phrase accurately identifies our extremely general idea of an intricate sensory experience. Anyone who has seen the oscillograph of an oboe tone knows that this tone is experienced by the ear as an intricately varying pattern of successive air pressures. Not one of us could distinguish consciously any single one of these air pressures which are the basic units of our perception of an "oboe A." This is not because our ear is insensitive to them, but rather because our mind immediately generalizes this array of sense-data into an inclusive single experience, the sound of an oboe. We are likewise not specifically conscious of recurrences in this pattern of air pressures. However, because the pattern does demonstrate recurrences at regular intervals, we distinguish its pitch level from those of other patterns where the recurrences are at different time intervals. The natural structural properties of this pitch sounded by an oboe assist us to identify it. Although we are not conscious of the discrete units of this sensory experience, the sense-data themselves, we are nevertheless able to abstract, from the intricate reality of the experience, the general notions of "A" and "oboe." A similar process of concept formation, relying upon the recognition of natural structures in all that we perceive, produces for us such physical concepts as "hot," such emotional concepts as "fear," and such spiritual concepts as "truth." As the total concept becomes more complex, we become able to identify specifically many of the sub-units that compose it. We speak of it as being articulate, that is, possessed of distinct elements or groups of elements which may be considered separately or in various deliberately formed relationships that may give rise to other acceptable concepts.

A musical composition is such a larger articulate structure. If the "oboe A" — an experience of whose sub-units we remain unaware — is placed in a succession of various oboe pitches, a musical phrase will result. This phrase is a larger unit of musical experience in which we are able to distinguish the sub-units, the successive pitch elements. This phrase may in turn become a sub-unit in a musical period, leading to further more extensive expansion of the musical experience to the length of a complete composition. Because this composition partakes of the same structural properties as experience in general, it will serve to represent some part of experience for its listeners. To sum up, experience can be said to exist on two general levels: the level of simple perception and the level of concept formation. The latter, in turn, consists of many levels, each level developing more inclusive concepts regarding the articulate conceptual elements of the less inclusive levels.

Since we cannot identify individual sense-data, they cannot serve as the units for any practical measure of structure in experience. In music, we must begin a study of structure at that already remarkably general level of concept, the individual sounding pitch. In dealing with an extended composition, we might assume some still more inclusive level of concept as the phrase or period to serve as the basis for our

considerations. Whatever level of generality we may choose as the base-line for our structural analysis, we will refer to the articulate units of this base-line as "events." A succession of events will be called a "pattern." It is our intention to define the properties of any possible pattern of events in terms of some measure that is independent of the particular sense to which the pattern may appeal. Fortunately, we are provided with such a measure in the universal phenomenon of entropy, expressed in the field of communication as "information."[1]

In the technical sense that the term is used here, information has no necessary connection with information in the every-day sense of general knowledge. "Information" is the technical term for a measure of the degree of randomness exhibited by a pattern of events. A totally random succession of events would produce a state of maximal informedness. Any evidence of order in a pattern of events would result in a reduction of this state of maximal informedness. Since a random situation is one of minimal predictability, it can be said that information is a measure of unpredictability. That which is not predicted, should it occur, will provide a maximum of information. That which is readily predicted, should it occur, will provide a minimum of information. In this instance our common-sense meaning for information is not different from its technical meaning. That the sun rises tomorrow is not very informative in the general sense because it is low-informed in the technical sense, i.e. it is readily predicted. Of course, the failure of the sun to rise, being altogether unpredicted in the pattern of astronomical events to date, would be a high-informed new event that would certainly also be an eminently newsworthy bit of general information.

This simple example demonstrates the underlying principle of our measure of structure in pattern. The informedness of each new event in a pattern depends upon the predictions that the pattern of events has led us to formulate to the moment. The new event may confirm these predictions or it may fail to confirm them. We shall use the expression "to nonconfirm" for this latter circumstance. Information will be a measure of the degree to which a single prediction or an array of predictions is "nonconfirmed" by the present event.[2] The general method for determining an exact value for the informedness of any

1. For an account of the application of information in the fields of electronic communication and language, see Shannon and Weaver, The Mathematical Theory of Communication (1949). For an account of the application of the same measures to problems of musical style, see Richard C. Pinkerton, "Information Theory and Melody," Scientific American, Vol. 194, 2:77-87 and Joseph E. Youngblood, "Style as Information," Journal of Music Theory, II:24-35.

2. This definition of information differs from that ordinarily used in the field of communication. The authors' reasons for developing this particular definition of information to measure structure in music are set forth in another article entitled "Information as a Measure of the Experience of Music" which, although prepared for reading over a year before this present article, will appear subsequently in the Journal of Aesthetics and Art Criticism.

given event will involve three steps. We will determine first all the predictions established by the pattern of events to the present. We will then determine whether the new event confirms or nonconfirms each prediction. A summation of the number of predictions nonconfirmed by the new event will constitute an information measure of the new event in the light of the pattern of events which preceded it.

It must be understood that we will be operating here under somewhat aseptic conditions. The patterns under consideration will be isolated from their environment and discussed as if they were each unique and in no wise affected by preceding or accompanying patterns. This will provide us with an analysis of the pattern in the abstract which can then be evaluated in terms of various types of context. This process is not unreasonable since the context of a pattern must also be a pattern whose properties could be similarly ascertained in the abstract. The problem of context does not become significant until empirical investigations are undertaken to substantiate the purely theoretical conclusions developed here. A logical analysis of the properties of pattern would provide the empiricist with a sensible basis for the control of context.

We will begin our demonstration of the information properties of a pattern of events by considering the simplest of all patterns, a single event, designated as "A." If this is the sole experience to date, it is the only possible prediction. Beginning with this experience, only two 2-event patterns are possible. They are "AA" and "AB." In the first of these, the second "A" confirms the array of predictions to date, generating a state of minimal informedness. In the second, the occurrence of "B" after "A" (and here "B" really means any "not-A") constitutes a state of maximal informedness. Maximal informedness is a property of the relationship of dissimilarity, the result of the nonconfirmation of a prediction. Minimal informedness is a property of the relationship of similarity, the result of the confirmation of a prediction.

We may take the symbol d to represent both a relationship of dissimilarity and a condition of maximal informedness. We may take the symbol s to represent both a relationship of similarity and a condition of minimal informedness. The symbols d and s will have a double significance wherever they appear in our analyses. As substantive indicators they will denote the relationships of dissimilarity and similarity respectively; as evaluative indicators, they will represent maximal and minimal states of informedness respectively. The relationships they denote will be the building blocks of our system; the values they represent will be the units of measurement in our system. The equation A/A = s will be an abbreviation for the expression "if event 'A' follows event 'A,' a relationship of similarity will exist at the second 'A,' and hence the second 'A' will be minimally informed." The equation A/B = d will be an abbreviation for "if event 'B' follows event 'A,' a relationship of dissimilarity will exist at event 'B,' and hence event 'B' will be maximally informed." Since the relationships d and s are substantive, they may themselves be the events in a pattern of events. This allows us to formulate the four basic equations, similar to those given above, that will provide the operational foundation for our meas-

urement of information in a pattern of events: $\underline{d}/\underline{d} = \underline{s}$, $\underline{s}/\underline{s} = \underline{s}$, $\underline{d}/\underline{s} = \underline{d}$, and $\underline{s}/\underline{d} = \underline{d}$.

When these equations are translated into words, their special relevance to problems of musical structure is evident. For example, the first equation ($\underline{d}/\underline{d} = \underline{s}$) tells us that the listener's past is one of maximal informedness ($\underline{d}$). He therefore predicts or anticipates a continuation of this state of maximal informedness. Our knowledge of the future in any case is nothing more than a presumed extension of all that we know to the present. If this condition of maximal informedness which the listener predicts on the basis of his past experience actually comes to be ($\underline{d}/\underline{d}$), then he is not astonished ($\underline{d}/\underline{d} = \underline{s}$). He is minimally informed. This is why compositions which doggedly persist in seeking out the unexpected become increasingly less interesting rather than increasingly more exciting. On the other hand, if the listener's prediction is nonconfirmed, if something minimally informed occurs ($\underline{d}/\underline{s}$), the overall experience will be one of surprise, maximal informedness ($\underline{d}/\underline{s} = \underline{d}$). An example of this would be the occurrence of so simple a fact as a major triad in a long series of extremely intense and complicated chords. The triad, being low-informed by nature, comes as a decided shock in a context which has led the listener to expect nothing but the most unpredictable stream of dissimilar chords. These basic equations of our system, then, are not dry abstractions from reality. They are actually succinct statements in two values of the simplest patterns of actual experience. Out of them we will develop a measure that will indicate with subtlety the infinite degrees of informedness that may develop between the crude extremes of maximal and minimal informedness.

In order to demonstrate the application of the basic equations given above to a specific problem in pattern, we will examine some selected 3-event patterns. Having presented two events in the pattern "AB," we wish to determine the difference in structural effect if we select "A," "B," or some heretofore unknown event, "C," as the next event in the pattern. To do so, we must first identify all the predictions established by the pattern "AB." There are four, one of which cannot always be tested in the light of the new event. They are "A," "B," a relationship of $\underline{d}$ which developed when "B" followed "A," and "AB" considered as a unit, that is, as if "B" were an extension of "A" rather than distinct from "A." This last-named prediction can only be considered under certain conditions, as indicated in Table I (see p. 133). In all the tables, where an $\underline{x}$ appears as a test value for a prediction, rather than a $\underline{d}$ or an $\underline{s}$, this indicates that the prediction under consideration either cannot or need not be tested. For example, in the pattern "ABA," it is possible that the structural unit "AB" is about to be repeated as the third and fourth events of the pattern. However, since this cannot be determined for certain, the prediction of "AB" as a unit cannot be tested at the third event in the pattern "ABA." On the other hand, in the pattern "ABB," it is clear that the predicted structural unit "AB" is already nonconfirmed by the occurrence of "B" as the third event. Therefore we may test the prediction "AB" with confidence at the third event and declare that it is nonconfirmed. Of course, this nonconfirmation at the third event makes a further test of the predic-

tion at the fourth event meaningless (as shown in Table III, p. 135). Its nonconfirmation was already firmly established at the third event. [3]

Table I (p. 133) is a summary of the predictions and the tests of the predictions for the patterns "ABA," "ABB," and "ABC." The table shows that there are three predictions that may be tested summarily if they can be tested at all. They are either fully confirmed or fully nonconfirmed by the third event in the pattern. As mentioned before, the prediction "AB" cannot be tested in the pattern "ABA." The fourth prediction, however, presents a more elaborate situation. Each test is a partial test of the fourth prediction, and the findings of the three tests must be averaged in order to determine exactly how much the fourth prediction is nonconfirmed. An averaging process requires numerical values. We may use "1" to indicate maximal informedness, "zero" to indicate minimal informedness. All information values must lie between these two extremes. Since d indicates a state of maximal informedness, we may substitute "1" for each d in Table I; likewise, since s indicates minimal informedness, we may substitute "zero" for each s in Table I. The results are shown in Table II (p. 133). Note that the values of d and s as partial tests of the fourth prediction have been averaged resulting in an overall nonconfirmation of this prediction of 0.50 for third event "A," 0.33 for third event "B," and 0.00 for third event "C."

As can be read from Table II, three predictions are tested at the third event in the pattern "ABA" and these predictions are 1.50 nonconfirmed. In the case of the pattern "ABB," four predictions are tested and 2.33 are nonconfirmed. In the case of the pattern "ABC," four predictions are tested and 3.00 are nonconfirmed. Our final informedness values should lie between "zero" (minimal informedness) and "1" (maximal informedness). This will be accomplished if the nonconfirmations are expressed as a percentage of the total predictions tested, that is, if the upper total in Table II is divided by the lower. Event "A" following the pattern "AB" is 50.0% informed, event "B" is 58.3% informed, and event "C" is 75.0% informed. From this, we know that the pattern "AB" predicts "A" most effectively since, when "A" occurs, it is the least informed of all the possible consequents to the pattern "AB"; it predicts "B" less effectively and "C" least effectively.

At first glance, it might seem that the pattern "AB" would in no wise predict the occurrence of event "C" and that, therefore, the occurrence of event "C" should be 100% informed. It is true that the events "A" and "B" do not, in a literal sense, suggest the possibility of anything other than "A" or "B" occurring in the future. However, taken together, they predict the possible recurrence of a relationship of dissimilarity. When event "C" occurs, this prediction is confirmed in that both "A/C" and "B/C" are structurally equivalent to "A/B."

3. Some not serious differences in information values developed in this article and in the article cited in footnote 2 resulted from a revision of our method for calculating the tests of this sort of prediction. The method described here produces more refined results than the method developed previously.

Table I

Tests of the Predictions for "AB."

Event 1			A	
Event 2			B	
Proposed events 3			A or B or C	
Predictions	**Tests**		**Test values**	
Event 1 (A)	(1/3)	s	d	d
Event 2 (B)	(2/3)	d	s	d
Events 1-2 as a unit (AB)	(12/3?)	x	d	d
Events 1/2 (d)	(1/2:1/3)	d	s	s
	(1/2:2/3)	s	d	s
	(1/2:12/3?)	x	s	s

Table II

A Numerical Equivalent for Table I.

Event 1			A	
Event 2			B	
Proposed events 3			A or B or C	
Predictions	**Tests**		**Test values**	
Event 1	(1/3)	0	1	1
Event 2	(2/3)	1	0	1
Events 1-2 as a unit	(12/3?)	-	1	1
Events 1/2	(1/2:1/3)			
	(1/2:2/3) Avg.	0.50	0.33	0.00
	(1/2:12/3?)			
Total nonconfirmations		1.50	2.33	3.00
Total predictions tested		3.00	4.00	4.00

Predictions in the form "A" or "ABC," for example, will be called literal predictions and would be confirmed only by the recurrence of the identical event or events that established the prediction. Predictions in the form "A/B" will be called first-order analogical predictions and would be confirmed by any other pair of events having a similar relationship. Higher-order analogical predictions (the form "A/B:A/C" would be an example) also figure in our computations (see Table III, p. 135). These analogical predictions have a considerable influence on the informedness of a given event when it occurs. This can be most effectively demonstrated by the pattern "ABCDEF." In the pattern "ABCDE" no event has occurred that would constitute a literal prediction of the event "F." However, because the pattern "ABCDE" predicts the relationship of dissimilarity extensively, the least informed event that can follow this pattern is the heretofore unknown event "F" (informedness 20.833%), while the recurrence of any one of the events which has already occurred is more surprising, hence, more informed (event "E," 26.664%). The reverse would be true if we considered only the literal predictions in the pattern "ABCDE."

Literal predictions never demonstrate the property of partial testing. Each literal prediction is tested immediately and uniquely, if it is tested at all, as each new event occurs. Analogical predictions of any order always exhibit the property of partial testing and must therefore be dealt with separately from the literal predictions.

In Table III (p. 135), which lists all the predictions and all the tests related to each prediction for the fourth event in every possible 4-event pattern, the tests indicated between the double lines are tests of literal predictions. All those listed below the lower double line are partial tests of the indicated first-order analogical predictions. The tests of each prediction are separated by a broken line. The tests involving higher-order relationships are given below the single solid line and, at the fourth event, all such tests constitute partial tests of a single prediction as indicated. It is important to distinguish between tests involving different-order relationships, even if they be tests of the same prediction. Note that the prediction "1/2" is tested under 6 conditions by various first-order relationships but under 72 conditions by various second-order relationships. The effect of any given test is extensively reduced as its order increases.

Table IV (p. 138) is a numerical summary of the tests listed in Table III. Note that the partial tests of any single prediction have been averaged in the same fashion as demonstrated in Table II. The total nonconfirmations, the total predictions tested, and finally the informedness of each possible fourth event are given at the bottom of Table IV.

Such a tabulation as shown in Table III becomes virtually impossible for 5-event patterns because a total of 197,210 tests of predictions might be necessary to determine the informedness of any selected fifth event. Fortunately, such a tabulation is not necessary because the entire operation can be reduced to a computation which, although cumbersome because of the size of the numbers, makes it possible to calculate the informedness of an event at any position in a pattern of any

Table III

Tests of the Predictive Array at Every Possible Fourth Event.

Event 1	A A A A A A A A A A A A A A A A
Event 2	A A A A A B B B B B B B B B B B
Event 3	A A B B B A A A B B B C C C C C
Event 4	A B A B C A B C A B C A B C D

Predictions and tests*	Test values
1/4	s d s d d s d d s d d s d d d
2/4	s d s d d d s d d s d d s d d
3/4	s d d s d s d d d s d d d s d
12/34	s d x x x d s d x x x x x x x
23/4?	x d x d d d x d d x d d x d d
123/4??	x d x d d x d d x d d x d d d
1/2:1/4	s d s d d d s s d s s d s s s
:2/4	s d s d d s d s s d s s d s s
:3/4	s d d s d d s s s d s s s d s
:12/34	s d x x x s d s x x x x x x x
:23/4?	x d x d d s x s s x s s x s s
:123/4??	x d x d d x s s x s s x s s s
1/3:1/4	s d d s s s d d d s s d s s s
:2/4	s d s d d s d s s d s s d s s
:3/4	s d s d s s d d s d s s s d s
:12/34	s d x x x d s d x x x x x x x
:23/4?	x d x s s d x d s x s s x s s
:123/4??	x d x s s x d d x s s x s s s
2/3:1/4	s d d s s d s s s d d d s s s
:2/4	s d d s s s d s d s d s d s s
:3/4	s d s d s d s s d s d s s d s
:12/34	s d x x x s d s x x x x x x x
:23/4?	x d x s s s x s d x d s x s s
:123/4??	x d x s s x s s x d d x s s s
12/3?:1/4	x x d s s x x x d s s d s s s
:2/4	x x d s s x x x s d s s d s s
:3/4	x x s d s x x x s d s s s d s
:12/34	x x x x x x x x x x x x x x x
:23/4?	x x x s s x x x s x s s x s s
:123/4??	x x x s s x x x x s s x s s s

Table III (cont.)

Event 1	A A A A A A A A A A A A A A A A
Event 2	A A A A A B B B B B B B B B B B
Event 3	A A B B B A A A B B B C C C C C
Event 4	A B A B C A B C A B C A B C D

Predictions and tests*	Test values
1/2:1/3#1/2:1/4	s d d s s s d d d s s d s s s
:2/4	s d d s s d s d s d s s d s s
:3/4	s d s d s s d d s d s s s d s
:12/34	s d x x x d x d x x x x x x x
:23/4?	x d x s s d x d s x s s x s s
:123/4??	x d x s s x d d x s s x s s s
#1/3:1/4	s d s d d d s s d s s d s s s
:2/4	s d s d d s d s s d s s d s s
:3/4	s d d s d d s s s d s s s d s
:12/34	s d x x x s d s x x x x x x x
:23/4?	x d x d d s x s s x s s x s s
:123/4??	x d x d d x s s x s s x s s s
#2/3:1/4	s d s d d s d d s d d d s s s
:2/4	s d s d d d s d d s d s d s s
:3/4	s d d s d s d d d s d s s d s
:12/34	s d x x x d s d x x x x x x x
:23/4?	x d x d d d x d d x d s x s s
:123/4??	x d x d d x d d x d d x s s s
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:2/4	x x s d d x x x s d s s d s s
:3/4	x x d s d x x x s d s s s d s
:12/34	x x x x x x x x x x x x x x x
:23/4?	x x x d d x x x s x s s x s s
:123/4??	x x x d d x x x x s s x s s s
:2/3#1/2:1/4	s d d s s d s s s d d d s s s
:2/4	s d d s s s d s d s d s d s s
:3/4	s d s d s d s s d s d s s d s
:12/34	s d x x x s d s x x x x x x x
:23/4?	x d x s s s x s d x d s x s s
:123/4??	x d x s s x s s x d d x s s s
#1/3:1/4	s d s d d s d d s d d d s s s
:2/4	s d s d d d s d d s d s d s s
:3/4	s d d s d s d d d s d s s d s
:12/34	s d x x x d s d x x x x x x x
:23/4?	x d x d d d x d d x d s x s s
:123/4??	x d x d d x d d x d d x s s s
#2/3:1/4	s d s d d d s s d s s d s s s
:2/4	s d s d d s d s s d s s d s s
:3/4	s d d s d d s s s d s s s d s
:12/34	s d x x x s d s x x x x x x x
:23/4?	x d x d d s x s s x s s x s s
:123/4??	x d x d d x s s x s s x s s s

Table III (cont.)

Event 1	A A A A A A A A A A A A A A A A
Event 2	A A A A A B B B B B B B B B B B
Event 3	A A B B B A A A B B B C C C C C
Event 4	A B A B C A B C A B C A B C D

Predictions and tests*	Test values
#12/3?:1/4	x x s d d x x x s d d d s s s
:2/4	x x s d d x x x d s d s d s s
:3/4	x x d s d x x x d s d s s d s
:12/34	x x x x x x x x x x x x x x x
:23/4?	x x x d d x x x d x d s x s s
:123/4??	x x x d d x x x x d d x s s s
:12/3?#1/2:1/4	x x d s s x x x d s s d s s s
:2/4	x x d s s x x x s d s s d s s
:3/4	x x s d s x x x s d s s s d s
:12/34	x x x x x x x x x x x x x x x
:23/4?	x x x s s x x x x s s s x s s
:123/4??	x x x s s x x x x s s x s s s
#1/3:1/4	x x s d d x x x d s s d s s s
:2/4	x x s d d x x x s d s s d s s
:3/4	x x d s d x x x s d s s s d s
:12/34	x x x x x x x x x x x x x x x
:23/4?	x x x d d x x x s x s s x s s
:123/4??	x x x d d x x x x s s x s s s
#2/3:1/4	x x s d d x x x s d d d s s s
:2/4	x x s d d x x x d s d s d s s
:3/4	x x d s d x x x d s d s s d s
:12/34	x x x x x x x x x x x x x x x
:23/4?	x x x d d x x x d x d s x s s
:123/4??	x x x d d x x x x d d x s s s
#12/3?:1/4	x x s d d x x x d s s d s s s
:2/4	x x s d d x x x s d s s d s s
:3/4	x x d s d x x x s d s s s d s
:12/34	x x x x x x x x x x x x x x x
:23/4?	x x x d d x x x s x s s x s s
:123/4??	x x x d d x x x x s s x s s s

*The prediction being tested is that value which appears only once at the far left of each column of test relationships.

"/" indicates a literal test
":" indicates a first-order analogical test
"#" indicates a second-order analogical test

Table IV

A Numerical Equivalent for Table III.

Event 1	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
Event 2	A	A	A	A	A	B	B	B	B	B	B	B	B	B	B
Event 3	A	A	B	B	B	A	A	A	B	B	B	C	C	C	C
Event 4	A	B	A	B	C	A	B	C	A	B	C	A	B	C	D
Predictions	**Test values**														
1	0.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00
2	0.00	1.00	0.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00
3	0.00	1.00	1.00	0.00	1.00	0.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	0.00	1.00
12	0.00	1.00	----	----	----	1.00	0.00	1.00	----	----	----	----	----	----	----
23	----	1.00	----	1.00	1.00	1.00	----	1.00	1.00	----	1.00	1.00	----	1.00	1.00
123	----	1.00	----	1.00	1.00	----	1.00	1.00	----	1.00	1.00	----	1.00	1.00	1.00
1/2	0.00	1.00	0.33	0.80	1.00	0.40	0.40	0.00	0.25	0.50	0.00	0.25	0.25	0.20	0.00
1/3	0.00	1.00	0.67	0.20	0.00	0.60	0.60	1.00	0.25	0.50	0.00	0.25	0.25	0.20	0.00
2/3	0.00	1.00	0.67	0.20	0.00	0.40	0.40	0.00	0.75	0.50	1.00	0.25	0.25	0.20	0.00
12/3?	----	----	0.67	0.20	0.00	----	----	----	0.25	0.50	0.00	0.25	0.25	0.20	0.00
1/2	0.00	1.00	0.42	0.65	0.75	0.50	0.50	0.50	0.46	0.50	0.42	0.25	0.25	0.20	0.00
Tests	0.00	10.00	3.76	6.05	6.75	4.90	4.90	7.50	4.96	4.50	6.42	4.25	4.25	5.00	5.00
Preds	8.00	10.00	8.00	10.00	10.00	9.00	9.00	10.00	9.00	9.00	10.00	9.00	9.00	10.00	10.00
Info (%)	00.0	100.0	46.9	60.5	67.5	54.4	54.4	75.0	55.1	50.0	64.2	47.2	47.2	50.0	50.0

length. A rigorous proof of this computation would be appropriate only to a mathematical journal and will be omitted here. The method will be outlined and proved by demonstration. Interested readers may then apply the method to ascertain the correctness of the authors' information values, given in Table XI (p. 152), which will be used later to develop certain points regarding musical structure. Readers who are not mathematically inclined may turn directly to page 148 where the musical applications of the calculated results are discussed.

We will begin with a general formula that will represent information in terms of predictions and tests of predictions. Information is the degree to which an array of predictions is nonconfirmed. Expressed as a formula:

$$1)\quad \text{information} = \frac{\text{nonconfirming tests of predictions}}{\text{predictions tested}}.$$

The correctness of this general formula can be tested by considering again the patterns "AA" and "AB." In each case, one prediction (A) is tested. In the case of "AA," no prediction is nonconfirmed; in the case of "AB," the single prediction "A" is nonconfirmed. Using formula 1), we get familiar results:

$$\text{information "AA"} = \frac{0}{1} = 0, \text{ and}$$

$$\text{information "AB"} = \frac{1}{1} = 1.$$

Formula 1) may be rewritten in a more useful form which will provide the same answers as above:

$$2)\quad \text{information} = \frac{1}{\text{predictions tested}} \times \left[\frac{\text{predictions tested}}{\text{total tests}} \times \text{nonconfirming tests.}\right]$$

Formula 2) does not alter the values of formula 1) because the fraction inside the brackets is equal to unity and therefore does not change the value of the product. This fraction is inserted here to provide a form in which a general formula for the informedness of event $\underline{n}$ (E_n) in a pattern of any length can be expressed as a single summation (cf. formulas 2) and 8)).

Let us now examine the more intricate situation of the 3-event patterns considered in Tables I and II. There are three or four predictions tested, depending upon the pattern under consideration. There are from four to six tests of these predictions. Furthermore, two or three of the tests deal summarily with two or three of the literal predictions ($pred_0$) while the other two or three are partial tests of a single first-order analogical prediction ($pred_1$). To represent this situation we must distinguish carefully between literal tests ($test_0$) of literal

predictions and first-order tests ($test_1$) of first-order analogical predictions. We will later have to consider predictions ($pred_2$) as they are tested by second-order analogical relationships ($test_2$). In the case of the 3-event patterns under consideration, the formula for determining the informedness of the third event (E_3) is merely an expansion of formula 2):

$$3)\ \text{information } E_3 = \frac{1}{pred_0 + pred_1} \times \left[\left(\frac{pred_0}{test_0} \times test_0\text{-nonconfirming}\right) + \left(\frac{pred_1}{test_1} \times test_1\text{-nonconfirming}\right)\right]$$

If we substitute the indicated values in formula 3), we get precisely the same percentile results as indicated on page 132:

$$\text{info ABA } (E_3) = \frac{1}{3}\left[\left(\frac{2}{2} \times 1\right) + \left(\frac{1}{2} \times 1\right)\right] = \frac{1}{3}(1.50) = .500,$$

$$\text{info ABB } (E_3) = \frac{1}{4}\left[\left(\frac{3}{3} \times 2\right) + \left(\frac{1}{3} \times 1\right)\right] = \frac{1}{4}(2.33) = .583,$$

$$\text{info ABC } (E_3) = \frac{1}{4}\left[\left(\frac{3}{3} \times 3\right) + \left(\frac{1}{3} \times 0\right)\right] = \frac{1}{4}(3.00) = .750.$$

Formula 3) may be further expanded to become a general statement for the computation of the informedness of the nth event in any pattern of events:

$$4)\ \text{info } (E_n) = \frac{1}{\sum_{i=n}^{i=0} pred_i} \sum_{i=n}^{i=0} \frac{pred_i}{test_i} (test_i\text{-nonconfirming}).$$

The application of this formula requires only that we have numerical values for each term of the formula. In our illustrations to date, we have derived these values from tabular computations for 3-event and 4-event patterns. We have already indicated that such tabular computations are very nearly impossible for patterns of any greater length. We will now develop a method for computing in a summary fashion the values needed to operate formula 4).

It is first necessary to determine values for $pred_0$, $test_0$, and to represent numerically the value of $test_0$-nonconfirming. These values will provide us with the material from which we may compute by methods to be demonstrated the values for $pred_i$, $test_i$, and $test_i$-nonconfirming. To date the authors have discovered no more efficient procedure than the tabular method for deriving the values for the literal level of calculation. All other values may be operationally derived from these.

As an example of the computation procedures, we will use the

pattern "ABBA." We may then compare our computed results with the tabular results given in Tables I to IV. We will begin by determining $pred_0$ and $test_0$ for the pattern "ABBA." Table VI (p. 142) represents all the literal predictions and the tests of these predictions. As we already knew from formulas 2) and 3), the values for $pred_0$ and $test_0$ are the same.

We must now compute some summary value for $test_0$-nonconfirming. In order to do so, we must provide numerical equivalents for the d and s values in Table VI. Furthermore, these numerical equivalents must be so chosen that the four basic operational equations for our system (see p. 131) will all be satisfied. In Table V (p. 142) this is demonstrated to be the case if the value +1 is substituted for s; the value -1, for d. It must be understood that these values stand only for the substantive meanings of s and d; +1 represents a relationship of similarity while -1 represents a relationship of dissimilarity. If this is kept in mind, these numerical equivalents for letter-symbols will not be confused with the numbers "0" and "1" that were earlier selected to represent states of minimal and maximal informedness.

We may now compute a summary value for the tests of predictions for each event in the pattern "ABBA" by substituting the numerical equivalents for the letters in Table VI and adding. The results are given in Table VII (p. 142). The summary of the test values (sum_0) given in Table VII represents the difference between the s and d test values. For example, the -1 under the second "B" in the pattern does not mean that there is a single d value for the tests at that event, but rather that the d values exceed the s by one. The -2 under the final "A" indicates that the d values exceed the s by 2. This can be confirmed by observing the columns of letters given for the same events under "Test values" in Table VI. If this summary of the test values of any event were positive rather than negative, this would indicate that the s values exceed the d.

We are concerned only with those tests of a prediction that prove to be nonconfirming. We wish to know the value of $test_0$-nonconfirming at each event. This may be computed from sum_0 by applying the following formula:

$$5)\quad test_0\text{-nonconfirming} = \frac{test_0 - sum_0}{2}\ .$$

Applying this formula to the values given in Table VII, we get the values for $test_0$-nonconfirming given in Table VIII (p. 142).

Formula 5) may be rewritten in a more general form to read:

$$6)\quad test_i\text{-nonconfirming} = \frac{test_i - sum_i}{2}\ .$$

By substituting the right-hand side of formula 6) for the left-hand side of formula 6) when the latter appears in formula 4), formula 4) becomes:

Table V

Numerical Equivalents for Operational Equations.

$\underline{s}/\underline{s} = \underline{s}$	$+1/+1 = +1$
$\underline{d}/\underline{d} = \underline{s}$	$-1/-1 = +1$
$\underline{s}/\underline{d} = \underline{d}$	$+1/-1 = -1$
$\underline{d}/\underline{s} = \underline{d}$	$-1/+1 = -1$

Table VI

Test Values for Pattern "ABBA."

Predictions	Test values			
	A	B	B	A
Event 1		d	d	s
Event 2			s	d
Event 3				d
Events 1-2 as a unit			d	x
Events 2-3 as a unit				d
Events 1-2-3 as a unit				x
$Pred_0$		1	3	4
$Test_0$		1	3	4

Table VII

A Numerical Equivalent for Table VI.

Predictions	Test values			
	A	B	B	A
Event 1		-1	-1	+1
Event 2			+1	-1
Event 3				-1
Events 1-2 as a unit			-1	x
Events 2-3 as a unit				-1
Events 1-2-3 as a unit				x
Summary of test values (sum_0)		-1	-1	-2

Table VIII

Computation of $Test_0$-nonconfirming.

	A	B	B	A
$Test_0$		1	3	4
Sum_0		-1	-1	-2
$Test_0$-nonconfirming		1	2	3

$$7)\quad \text{info } E_n = \frac{1}{\sum_{i=n}^{i=0} \text{pred}_i} \sum_{i=n}^{i=0} \frac{\text{pred}_i}{\text{test}_i} \left(\frac{\text{test}_i - \text{sum}_i}{2} \right) .$$

By actually performing the operations indicated in formula 7) and rearranging the terms we come to the most useful form of the formula for purposes of actual computation:

$$8)\quad \text{info } E_n = .50 - \left[\frac{1}{2\sum_{i=n}^{i=0} \text{pred}_i} \sum_{i=n}^{i=0} \frac{\text{pred}_i \times \text{sum}_i}{\text{test}_i} \right] .$$

It remains to demonstrate the general validity of formula 6). To do so, we must actually compute the values for sum_i and test_i and demonstrate that they may be operated with in the same way as formula 5) operates with sum_0 and test_0. We must find a method for computing sum_i at the nth event so that its value will always represent the difference between s and d test values at any level of calculation. The general formula for this computation is:

$$9)\quad \text{sum}_i(E_n) = \left[\text{sum}_{i-1}(E_n)\right] \sum_{j=n-i-2}^{j=n-1} \left[\text{sum}_{i-1}(E_j)\right] .$$

In words, $\text{sum}_i(E_n)$ is the product of the value of the present event in the next lower order of relationships and the sum of the test values for all the past events in that level. When the computation is laid out in the diagrammatic form indicated below, it can be easily remembered as "the sum of the past multiplied by the present," all at the preceding level. For the pattern "ABBA," this computation would be:

	A	B	B	A
sum_0		[(-1)	+ (-1)]	x (-2)
sum_1			1	4
sum_2				4

These results may be checked against the actual values in Tables I and III. For example, the tests of pred_1 given for the form "ABB" in Table I show 2 s values and one d value, an excess of one s value as our computed result +1 for sum_1 above would indicate. The values for sum_1 at the fourth event in the pattern "ABBA" may be found in the column for that pattern between the lower double line and the solid single line in Table III. Actual counting will show that there are 10 s values and 6 d values, the excess of 4 s values indicated by the above calculation. Finally, values for sum_2 for the fourth event may be found below the single solid line in the "ABBA" column of Table III. Again, an actual count shows 26 s values and 22 d values, a preponderance of 4 s values as computed above. It is clear that this method of calculation does produce values for sum_i at any level which are of the same type as those already determined for sum_0.

Table IX

Computation of Informedness for Pattern "ABBA."

$Pred_i$

A	B	B	A
	1	3	4
		1	4
			1
Σ	1	4	9

Sum_i

A	B	B	A
	-1	-1	-2
		1	4
			4

$Test_i$

A	B	B	A
	1	3	4
		3	16
			48

$Pred_i \times sum_i$

$Test_i$

A	B	B	A
	-1.00	-1.00	-2.00
		0.33	1.00
			0.08
Σ	-1.00	-0.67	-0.92

$$\text{info } E_2 = .50 - \frac{1}{2}(-1.00) = 1.00$$

$$\text{info } E_3 = .50 - \frac{1}{8}(-0.67) = 0.58$$

$$\text{info } E_4 = .50 - \frac{1}{18}(-0.92) = 0.55$$

It remains to determine the values for $test_i$. If all the values for $test_0$ were assumed to be the same, $\underline{s}$, the computation for $test_i$ would be identical to the computation for sum_i. This is because the computation of sum_i is merely a summary procedure for operating repeatedly the basic equations of our system given on page 131. If we assume that all values of $test_0$ are $\underline{s}$, then all our results at any level of relationship would be $\underline{s}$ since $\underline{s}/\underline{s}$ can lead to no value other than $\underline{s}$ itself. We may then determine $test_i$ from $test_0$ by exactly the same calculation that we used to determine sum_i from sum_0. The results are:

	A	B		B		A
$test_0$		(1	+	3)	x	4
$test_1$				3		16
$test_2$						48

These values may be checked in the appropriate places in Tables I and III, and they will be found to be correct. For example, below the single solid line in Table III in the "ABBA" column, there are indeed 48 tests made. We have now demonstrated the generality of formula 6), and its use to develop formula 8) is justified.

We are still without a procedure for determining readily the values of $pred_i$ which are essential to the complete operation of formula 8). We do have values for $pred_0$. The general formula for the computation of $pred_i$ is:

10) $pred_i(E_n) = pred_i(E_{n-1}) + pred_{i-1}(E_{n-1})$.

The accuracy of the results obtained by applying this formula can be tested for the pattern "ABBA":

	A	B	B	A
$pred_0$		1	3	4
$pred_1$			1	4
$pred_2$				1

A complete computation for the informedness of each event in the pattern "ABBA" may now be made by applying formula 8). Table IX (p. 144) demonstrates the complete computation. Table X is a final complete demonstration of the application of formula 8) to compute the informedness of each event in the 6-event pattern "ABAACA." It is this type of computation which produced the values given in Table XI (p. 152) where the informedness for each event in every possible 6-event pattern of events may be found.

It is the flux of information created by progression from event to event in a pattern of events that constitutes the reality of experience, and it is this information flux that is the mensurable aspect of experience. If methods for interpreting this measure of experience can be developed, they will provide a useful tool for the analysis of musical structure. The authors will propose a few interpretations, none of

Table X

Computation of Informedness for Pattern "ABAACA."

Predictions		Test Values				
Event	A	B	A	A	C	A
1		d	s	s	d	s
2			d	d	d	d
3				s	d	s
4					d	s
5						d
1-2			x	d	d	x
2-3				d	x	d
3-4					d	x
4-5						x
1-2-3				x	d	x
2-3-4					d	x
3-4-5						x
1-2-3-4					d	x
2-3-4-5						d
1-2-3-4-5						x
$Pred_0$		1	2	5	9	7
$Test_0$		1	2	5	9	7
Sum_0		-1	0	-1	-9	-1

$Pred_i$

A	B	A	A	C	A
	1	2	5	9	7
		1	3	8	17
			1	4	12
				1	5
					1
Σ	1	3	9	22	42

Sum_i

A	B	A	A	C	A
	-1	0	-1	-9	-1
		0	1	18	11
			0	18	209
				0	3762
					0

$Test_i$

A	B	A	A	C	A
	1	2	5	9	7
		2	15	72	119
			30	1224	10591
				36720	13281114
					487682506080

Table X (cont.)

$\frac{\text{Pred}_i \times \text{sum}_i}{\text{Test}_i}$

A	B	A	A	C	A
	-1.000	0.000	-1.000	-9.000	-1.000
		0.000	0.200	2.000	1.571
			0.000	0.588	0.239
				0.000	0.001
					0.000
Σ	-1.000	0.000	-0.800	-6.412	0.811

---

info $E_2 = .50 - \frac{1}{2}(-1.000) = 1.000$*

info $E_3 = .50 - \frac{1}{6}(0.000) = 0.500$

info $E_4 = .50 - \frac{1}{18}(-0.800) = 0.544$

info $E_5 = .50 - \frac{1}{44}(-6.412) = 0.641$

info $E_6 = .50 - \frac{1}{84}(0.010) = 0.490$

* This and the following results may be checked in Table XI.

which have been sufficiently tested empirically to confirm their validity.[4] It is, however, such rationally developed methods of interpretation, formulated on the basis of an objective measure, that could serve as the basis for countless carefully planned empirical tests.

The listener responds to music in two ways: he attends to it, and he is satisfied by it. If a composition is to be effective, its pattern must be one that, first of all, attracts and holds the attention of the listener and, secondly, rewards the listener for his attention. It is evident that only something which is informative will attract the listener's attention. This means that the pattern must be as high-informed as possible. On the other hand, the listener is rewarded by confirmations of his predictions. He would become frustrated and ultimately inattentive if a composition consistently nonconfirmed his predictions. This means that the pattern must be as low-informed as possible. The paradox of artistic creation could be no more bluntly stated. It is necessary to make a pattern which is simultaneously both as high-informed and as low-informed as possible in order to accomplish the contradictory requirements for keeping a listener. The composer is saved from despair in this dilemma by the fact of temporal succession which permits him to satisfy the conflicting desires of his listener by dealing with them alternately. He arranges two events in succession to achieve a maximum information gain in order to capture his listener's attention and rewards him with a third event which achieves a maximum information reduction. He continues in somewhat this fashion on every level of structural organization throughout the course of a composition. Although the concept of level in structural organization would require a second lengthy article to develop, it can be said here that the existence of various levels of organization makes it possible to arrange a pattern in such a way that both the requirements for maintaining the interest of a listener may be consistently achieved simultaneously, one at one level, the other at another. This successful presentation of an apparent paradox is characteristic of the most significant musical creations.

When a composition achieves this goal, we speak of it as being "highly articulate." We mean this compliment in two senses: it is a forceful communication which is extremely clearly organized. If we wish to assess the articulateness (on a single level only) of the many 6-event patterns for which we have given exact information values in Table XI, we must find some numerical expression for the paradoxical process described above. This is not difficult. Articulateness can be computed as the average information flux in the course of a pattern. The pattern exhibiting both the largest gains and the largest reductions of information would have the maximum index of articulateness. Patterns which demonstrate lesser gains or reductions of information would have smaller indices of articulateness. Obviously, the least articulate pattern would be "AAAAAA" with an index of "00.000." The pattern "AAAAAB" is somewhat more articulate with an index of

4. Other interpretations of information values and other applications of the methods described here can be found in the article cited in footnote 2.

"20.000." Such patterns as "ABACAD" (index 41.375) and "ABACDE" (index 42.917) are obviously very articulate.

Such a general measure of communicative effectiveness is somewhat misleading however. A listener wants not only to be attracted by a composition while it is in progress; he wishes also to carry away with him some concise impression of the composition. He hopes to reduce the large number of aural sense-data that constitutes his experience of the composition to a few brief musical patterns that will characterize the composition for him. In terms of the layman, he wishes his musical experience to "have a point."

By making another application of the principle of reward, we may demonstrate how a pattern of events establishes one or more of the events in the pattern as its "point." It is a principle of general learning theory that reward is one of the basic means by which learning is reinforced. We learn most readily those advices that are associated with satisfaction, with rewarding results. We have already indicated that the listener is rewarded by a confirmation of his predictions. The greater the confirmation, the greater his satisfaction. Any reduction in information represents an increased state of confirmation; therefore, the information reduction occasioned by the occurrence of any particular event constitutes a reward for the listener. The listener learns this rewarding event more readily than other less rewarding events that occasion gains in information, and he regards the better-learned event as more significant than the other events in the pattern. The greater the information reduction associated with a particular event, the more effectively that event becomes the "point," "subject," or "theme" of the pattern of events.

This line of reasoning allows us to make another useful numerical interpretation of the information values given in Table XI. We wish to know how effectively a given pattern establishes one or more of its elements as significant with respect to other elements in the pattern. We will call this an index of hierarchy. This index will be computed as the average of the information reductions created by a pattern. To demonstrate the refinement that this second index provides, let us reconsider the patterns "ABACAD" and "ABACDE." With regard to articulateness, it was found that pattern "ABACDE" was superior. With regard to hierarchy, however, pattern "ABACAD" (index 38.272) far excels pattern "ABACDE" (index 29.862). Although the maximum information reduction in both patterns is associated with occurrences of event "A," thus making event "A" the point of both patterns, it is evident that the pattern "ABACAD" makes this point far more effectively than the pattern "ABACDE." A common sense examination of the information values for each pattern provides an explanation for this.

As can be seen in Table XII, pattern "ABACAD" develops two information reductions and both are associated with the same event, event "A." In the pattern "ABACDE," there are three information reductions and, although the largest one is still associated with event "A," two lesser ones are associated with events "D" and "E." These latter two reductions tend to confuse our initial impression that event

"A" is of primary significance since they suggest events other than "A" as weaker but possible points in the pattern. In the pattern "ABACAD," the second information reduction confirms our initial impression that event "A" is the point of the pattern.

Table XII
Comparison of Patterns "ABACAD" and "ABACDE."

	A	B	A	C	A	D
Information	00.000	100.000	50.000	75.000	48.456	50.762
Reductions			50.000		27.544	
	A	B	A	C	D	E
Information	00.000	100.000	50.000	75.000	50.152	35.414
Reductions			50.000		24.848	14.738

A pattern with a single large information reduction will make a point more effectively than a pattern with several lesser information reductions, even though the overall information reduction achieved by the latter pattern may be greater. Because our index of hierarchy involves an averaging process, it automatically advises us whether the information reduction achieved by the entire pattern is associated effectively with a minimum number of events or is distributed ineffectually over a large number of events in the pattern. The former case, as illustrated by the two patterns selected above, produces, as it should, a larger index of hierarchy. Furthermore, since it is always true that larger information reductions are associated with recurrences of an event which has predominated the pattern already, the largest indices of hierarchy will result for those patterns where the information reductions are consistently associated with recurrences of the same event, that is, those patterns that make a single point with great force.

It has probably become apparent to our readers that what we have been discussing throughout this article is well known to them as that admixture of "unity" and "variety" that is so often encountered in critical discussions of effective artistic communication. It is generally conceded that a significant work of art achieves "unity" through "variety" or, put differently, "variety" within "unity." Most discussions proceed from this acceptable but very general maxim to various hardly helpful accounts of the deep mystery which only unfettered genius can penetrate to achieve this desirable artistic goal. In contrast, our measures of communicative effectiveness are forthright statements of this artistic principle expressed in concrete terms. Indeed, the basic values that we have used for computing information are nothing but "unity" and "variety" in their primordial states, the relationships of similarity and dissimilarity existing between individual events in a pattern. Our index of articulateness is a measure of how neatly the conditions of "unity" and "variety" have been arranged so that the force of neither is dulled. Our index of hierarchy is a measure of how successfully a "variety" of events has been arranged to leave an impression of "unity." Taken together, these two measures constitute an objective

analysis of a pattern of events to demonstrate how effectively it achieves simultaneously the desirable but apparently contradictory aims of maximal "unity" within maximal "variety." A careful investigation of the actual values given in Table XI will demonstrate to the reader that "unity" enhances "variety" and, conversely, "variety" enhances "unity." A noticeable predominance of either results in a decrease in the effectiveness of both.

Information, as computed here, provides us with a way of measuring more exactly those properties of pattern that have always been recognized as essential. Once the facts regarding the nature of pattern can be stated rigorously, it will become possible to develop a general theory of formal process in music. Since information is a measure of formal effectiveness that is independent of the specific nature of the elements composing the pattern, exact structural comparisons between musical and non-musical experiences will become feasible, paving the way to a sound theory of the symbolic processes in music. It seems reasonable to assume that the musical symbol and the reality it symbolizes have in common nothing more than their structural properties. It is these which our measure defines explicitly. There would seem to be no end to the practical and experimental avenues that such an exact account of structure would open up to the imaginative music theorist.

Table XI
An Analysis of all 6-event Patterns.

Informedness of Each Event						Index of Articulateness	Index of Hierarchy
A 00.000	A 00.000 (00.000)* [00.000]	A 00.000 (00.000) [00.000]	A 00.000 (00.000) [00.000]	A 00.000 (00.000) [00.000]	A 00.000 B 100.000	00.000 20.000	00.000 00.000
				B 100.000 (25.000) [00.000]	A 47.873 B 60.945 C 63.788	30.425 27.811 27.242	52.127 39.055 36.212
			B 100.000 (33.333) [00.000]	A 47.500 (38.125) [52.500]	A 73.759 B 59.535 C 64.561	35.752 32.907 33.912	52.500 52.500 52.500
				B 59.886 (35.028) [40.114]	A 50.000 B 39.741 C 50.923	30.000 32.052 29.815	25.000 30.130 24.538
				C 59.545 (35.114) [40.455]	A 50.000 B 47.570 C 48.425 D 48.751	30.000 30.486 30.315 30.249	25.000 26.215 25.788 25.624
		B 100.000 (50.000) [00.000]	A 46.875 (50.911) [53.125]	A 50.000 (39.062) [53.125]	A 48.911 B 58.395 C 64.219	31.468 32.929 34.094	27.107 53.425 53.525

* The indices shown in the last two columns are for the full 6-event patterns. The indices for patterns of shorter length are found under the final events of the patterns in the main section of the table. The index of articulateness is in parentheses; the index of hierarchy, in brackets.

Table XI (cont.)

Informedness of Each Event						Index of Articulateness	Index of Hierarchy
A 00.000	A 00.000 (00.000) [00.000]	B 100.000 (50.000) [00.000]	A 46.875 (50.911) [53.125]	B 60.412 (41.666) [53.125]	A 49.829 B 52.666 C 55.427	35.449 34.882 34.329	31.854 30.436 29.055
				C 70.100 (44.088) [53.125]	A 50.000 B 47.872 C 49.509 D 48.421	39.290 39.716 39.388 39.606	36.112 37.176 36.358 36.902
			B 60.500 (46.454) [39.500]	A 49.830 (37.542) [25.085]	A 44.823 B 52.190 C 56.547	31.035 30.506 31.377	18.374 25.085 25.085
				B 51.616 (37.096) [24.192]	A 49.176 B 49.941 C 51.571	30.165 30.012 29.686	16.924 16.670 16.127
				C 55.781 (36.055) [22.110]	A 44.760 B 44.567 C 43.345 D 41.685	31.048 31.087 31.331 31.663	18.395 18.459 18.866 19.419
			C 67.500 (44.122) [32.500]	A 48.467 (37.883) [25.766]	A 49.911 B 51.189 C 52.067 D 53.469	30.595 30.851 31.027 31.307	25.766 25.766 25.766 25.766

Table XI (cont.)

Informedness of Each Event						Index of Articulateness	Index of Hierarchy
A 00.000	A 00.000 (00.000) [00.000]	B 100.000 (50.000) [00.000]	C 67.500 (44.122) [32.500]	B 48.271 (37.932) [25.864]	A 44.753	31.049	18.397
					B 44.904	31.019	18.347
					C 45.232	30.954	18.238
					D 43.280	31.344	18.888
				C 49.893 (37.527) [25.054]	A 44.326	31.135	18.539
					B 41.812	31.638	19.377
					C 44.146	31.171	18.599
					D 40.736	31.853	19.735
				D 49.858 (37.536) [25.071]	A 41.928	31.614	19.338
					B 37.643	32.471	20.765
					C 37.643	32.471	20.765
					D 38.389	32.322	20.516
					E 35.489	32.902	21.482
	B 100.000 (100.000) [00.000]	A 50.000 (75.000) [50.000]	A 54.444 (51.430) [50.000]	A 50.000 (39.722) [27.222]	A 50.000	31.778	27.222
					B 55.695	32.917	27.222
					C 62.193	34.216	27.222
				B 58.824 (39.822) [50.000]	A 50.000	33.715	29.412
					B 51.153	33.485	28.836
					C 54.614	32.792	27.105
				C 64.145 (41.444) [50.000]	A 49.036	35.951	32.554
					B 46.758	36.306	33.694
					C 48.517	35.955	32.814
					D 48.187	36.021	32.979

Table XI (cont.)

Informedness of Each Event						Index of Articulateness	Index of Hierarchy
A 00.000	B 100.000 (100.000) [00.000]	A 50.000 (75.000) [50.000]	B 54.444 (51.430) [50.000]	A 50.000 (39.722) [27.222]	A 54.735	32.725	27.222
					B 50.945	31.967	27.222
					C 62.193	34.216	27.222
				B 57.073 (39.268) [50.000]	A 50.892	32.651	28.091
					B 50.446	32.740	28.314
					C 54.993	31.831	26.040
				C 64.145 (41.444) [50.000]	A 47.286	36.201	33.430
					B 47.108	36.236	33.518
					C 47.629	36.132	33.258
					D 47.036	36.251	33.554
			C 75.000 (58.275) [50.000]	A 48.456 (50.386) [38.272]	A 50.762	40.770	38.272
					B 50.342	40.686	38.272
					C 51.841	40.986	38.272
					D 53.785	41.775	38.272
				B 48.413 (50.397) [38.294]	A 44.698	41.060	26.741
					B 44.862	41.028	26.686
					C 43.665	41.267	27.085
					D 43.350	41.330	27.189
				C 50.114 (49.972) [37.443]	A 44.004	41.199	26.972
					B 44.848	41.030	26.691
					C 44.104	41.179	26.938
					D 40.717	41.857	28.066

Table XI (cont.)

Informedness of Each Event						Index of Articulateness	Index of Hierarchy
A 00.000	B 100.000	A 50.000	C 75.000	D 50.152	A 41.232	41.754	27.895
	(100.000)	(75.000)	(58.275)	(49.962)	B 36.855	42.629	29.352
	[00.000]	[50.000]	[50.000]	[37.424]	C 37.536	42.493	29.126
					D 38.238	42.352	28.892
					E 35.414	42.917	29.832
		B 58.333	A 55.093	A 52.379	A 50.697	29.861	12.326
		(70.834)	(48.254)	(36.905)	B 49.874	30.025	12.532
		[41.667]	[22.454]	[15.858]	C 53.807	29.810	15.858
				B 51.109	A 51.960	29.948	16.281
				(37.223)	B 50.215	29.957	12.446
				[16.281]	C 56.266	30.810	16.281
				C 59.416	A 44.577	32.814	19.929
				(37.308)	B 44.760	32.777	19.868
				[22.454]	C 43.386	33.052	20.325
					D 40.931	33.543	21.143
			B 50.000	A 58.391	A 52.149	32.927	18.729
			(50.000)	(39.598)	B 49.316	33.493	19.672
			[25.000]	[25.000]	C 54.358	32.485	17.993
				B 48.322	A 58.903	32.452	17.209
				(37.920)	B 46.931	30.614	13.267
				[17.209]	C 61.704	33.012	17.209

Table XI (cont.)

Informedness of Each Event						Index of Articulateness	Index of Hierarchy
A 00.000	B 100.000 (100.000) [00.000]	B 58.333 (70.834) [41.667]	B 50.000 (50.000) [25.000]	C 65.074 (41.268) [25.000]	A 46.808	36.468	22.733
					B 50.000	36.029	21.670
					C 47.624	36.505	22.461
					D 47.036	36.622	22.657
			C 64.167 (49.118) [41.667]	A 45.362 (41.576) [30.236]	A 46.096	33.408	30.236
					B 47.505	33.648	30.236
					C 42.858	33.762	20.971
					D 45.046	33.324	20.242
				B 47.681 (40.997) [29.076]	A 49.234	33.108	29.076
					B 48.893	33.040	29.076
					C 49.401	33.141	29.076
					D 44.528	33.428	20.415
				C 48.497 (40.793) [28.668]	A 41.148	34.104	21.540
					B 43.945	33.545	20.609
					C 43.673	33.599	20.700
					D 39.901	34.353	21.956
				D 47.996 (40.918) [28.919]	A 36.676	34.998	23.030
					B 41.371	34.059	21.466
					C 36.676	34.998	23.030
					D 37.415	34.851	22.784
					E 34.272	35.479	23.830

Table XI (cont.)

Informedness of Each Event						Index of Articulateness	Index of Hierarchy
A 00.000	B 100.000	C 75.000	A 47.222	A 48.583	A 48.970	30.905	26.389
	(100.000)	(62.500)	(50.875)	(38.535)	B 47.906	30.963	17.801
	[00.000]	[25.000]	[26.389]	[26.389]	C 48.845	30.900	26.389
					D 49.672	31.046	26.389
				B 47.639	A 45.327	31.101	18.345
				(38.299)	B 45.327	31.101	18.345
				[26.389]	C 45.327	31.101	18.345
					D 44.674	31.232	18.562
				C 49.338	A 46.519	31.543	18.514
				(38.724)	B 41.882	32.470	20.058
				[26.389]	C 44.520	31.943	19.179
					D 42.121	32.422	19.978
				D 51.330	A 40.602	33.523	21.147
				(39.222)	B 35.908	34.462	22.711
				[26.389]	C 36.549	34.333	22.497
					D 37.300	34.183	22.247
					E 34.130	34.817	23.303
			B 47.222	A 47.639	A 45.852	30.996	18.170
			(50.875)	(38.299)	B 47.378	30.691	17.662
			[26.389]	[26.389]	C 44.666	31.234	18.565
					D 44.674	31.232	18.562

Table XI (cont.)

Informedness of Each Event						Index of Articulateness	Index of Hierarchy
A 00.000	B 100.000	C 75.000	B 47.222	B 49.559	A 46.694	31.596	18.529
	(100.000)	(62.500)	(50.875)	(38.779)	B 48.342	31.266	17.980
	[00.000]	[25.000]	[26.389]	[26.389]	C 45.855	31.764	18.809
					D 47.011	31.533	18.424
				C 49.559	A 46.694	31.596	18.529
				(38.779)	B 48.342	31.266	17.980
				[26.389]	C 47.541	31.427	18.247
					D 47.011	31.533	18.424
				D 51.330	A 36.549	34.333	22.497
				(39.222)	B 41.276	33.388	20.923
				[26.389]	C 36.549	34.333	22.497
					D 37.300	34.183	22.247
					E 34.130	34.817	23.303
			C 50.000	A 43.904	A 45.505	31.539	18.680
			(50.000)	(39.024)	B 44.673	31.373	18.680
			[25.000]	[18.680]	C 45.020	31.442	18.680
					D 44.135	31.265	18.680
				B 45.389	A 42.352	31.530	14.412
				(38.554)	B 43.892	31.222	14.027
				[18.185]	C 43.823	31.235	14.044
					D 41.536	31.693	14.616

Table XI (cont.)

Informedness of Each Event						Index of Articulateness	Index of Hierarchy
A 00.000	B 100.000	C 75.000	C 50.000	C 47.234	A 46.545	30.691	13.364
	(100.000)	(62.500)	(50.000)	(38.192)	B 45.741	30.852	13.565
	[00.000]	[25.000]	[25.000]	[17.571]	C 49.390	30.484	17.571
					D 46.822	30.636	13.294
				D 45.999	A 34.630	32.874	16.092
				(38.500)	B 33.891	33.222	16.527
				[17.982]	C 40.012	31.998	14.997
					D 36.361	32.728	15.910
					E 32.954	33.409	16.762
			D 50.000	A 26.129	A 40.299	37.608	24.599
			(50.000)	(43.468)	B 39.924	37.533	24.599
			[25.000]	[24.599]	C 37.531	37.055	24.599
					D 37.531	37.055	24.599
					E 36.124	36.773	24.599
				B 37.013	A 35.471	32.906	16.132
				(40.747)	B 39.095	33.014	20.975
				[20.975]	C 34.734	33.053	16.316
					D 35.471	32.906	16.132
					E 33.266	33.347	16.684

Table XI (cont.)

Informedness of Each Event						Index of Articulateness	Index of Hierarchy
A 00.000	B 100.000	C 75.000	D 50.000	C 37.013	A 35.471	32.906	16.132
	(100.000)	(62.500)	(50.000)	(40.747)	B 34.734	33.053	16.316
	[00.000]	[25.000]	[25.000]	[20.975]	C 39.098	33.014	20.975
					D 35.471	32.906	16.132
					E 33.266	33.347	16.684
				D 38.587	A 33.712	33.257	16.572
				(40.353)	B 33.136	33.373	16.716
				[20.451]	C 33.712	33.257	16.572
					D 38.361	32.328	15.410
					E 30.542	33.892	17.364
				E 34.783	A 26.001	34.800	18.500
				(41.304)	B 25.480	34.904	18.630
				[21.717]	C 26.001	34.800	18.500
					D 26.001	34.800	18.500
					E 26.664	34.667	18.334
					F 20.833	35.833	19.792

THE PRINCIPLE OF DIRECTION IN THE MOTION OF SIMILAR TONAL HARMONIES

by

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A simple succession of harmonies is a series of musical sonorities in which no necessary order of appearance is implied. Ex. 1a typifies such a simple succession. If this series of harmonies be reversed (Ex. 1b), or otherwise re-arranged in arbitrary fashion (Exx. 1c, 1d, 1e), no violation of any expected direction of motion is created. We may take it as characteristic of such successions that they do not imply any necessary motion in a given direction, nor indeed any motion at all. In this characteristic a simple succession of harmonies departs from the conditions of traditional tonality.

In the framework of tonality, the motion of harmonies involves not only their simple succession in time and their orientation with reference to a key-center, but also a sense of direction of motion, conditional on that orientation. The placing of harmonies in a certain order will satisfy our expectations under tonal conditions and will, at the same time, verify those conditions as the framework of our listening; some other sequence of the same harmonies will seem distinctly less satisfactory, or may frustrate our expectations, temporarily as planned, or entirely. In tonal music it is a matter of consequence in which order harmonies are heard.

Ex. 2a shows a routine tonal cadence. If this sequence of harmonies be reversed (Ex. 2b), the effect is that of motion in the "wrong" direction. And if the sequence be disrupted and re-arranged as in Ex. 2c, not only the direction of motion, but other relationships among the successive harmonies seem faulty; they violate the framework of tonality which they simultaneously lead us to assume.

The ordering of tonal harmonies in terms of their direction of motion has been recognized in a limited way. The recognition has been largely pragmatic rather than generalized. Very common is the injunction that a subdominant harmony may readily progress to a dominant harmony, whereas the reverse order is not advisable. Common practice suggests the introduction of a seventh into a chord following the chord's appearance in simple triadic form (Ex. 3a) as preferable to the omission of the seventh after it has once been introduced (Ex. 3b). Common practice likewise suggests a refinement of this last point: this normal succession may well be reversed under certain rhythmic conditions, i.e., where the appearance of the octave tone following the seventh in the same line takes on the character of an escape tone (Ex. 3c).

These remain, however, fairly isolated examples dependent upon

Example 1.

a) Ravel: Pavane

b)

c) d) e)

Example 2.

a) b) c)

Example 3.

a) b) c)

an accumulation of unsystematized experience. A definite need for more general guidance emerges when the study of traditional tonal harmony results in a vocabulary sufficiently extensive so that a large number of possible alternatives are available for the harmonization in standard practice of the same passage. The selection from among numerous alternatives of the procedure most probably leading to a satisfying solution, or better, to the one among several acceptable procedures which best fulfills the stylistic objectives in the specific circumstance, becomes fairly acute. Without the establishment of some clear principle of direction of motion at this stage, the practitioner is left to experiment endlessly by trial-and-error; to follow an "instinctive" choice in each instance, guided by previous but unanalyzed familiarity with common solutions; or at worst, to remain unsure and tentative in any choice, thereby losing conviction and musical impulse.

Let us examine the problem at an early stage in the acquisition of a vocabulary of tonal harmonic procedure. Suppose that an understanding of the normal triad formations of the key and, perhaps, seventh chords and their proper interconnections by normal voice-leading has been reached. The concept of chord inversion is introduced. It develops that in many circumstances the inverted form may be used in place of the root position; in others it may be interchanged with the root position, preceding or following it; and in certain cases the inverted form is preferable. Even different internal arrangements of inverted or root forms in repetitions of a harmony have subtly varying values. Moreover, the possible preference of an inverted form or root form is far from absolute. It is dependent upon a wide variety of considerations such as tempo, meter, texture, proximity to cadence, effective bass line, preceding or following movement of harmonies, and so on. Thus there cannot be a single solution valid for all cases, and a high degree of refinement is required in a choice where the differences in effect between one treatment and another seem slight.

The flexibility evident here leads to the common theoretical conclusion that no principle or rule can possibly embrace all the conditions met with in practice; that such a principle as might be constructed through speculation could serve only to restrict the musical ear and imagination, which can intuitively judge the circumstances; that the dividing point between what should be done and what may be done cannot be specified more precisely to any fruitful end.

Much of this is true. And yet we cannot accept the resulting reliance upon uninformed intuition alone, or upon pragmatic experience alone, or upon partial injunctions in limited cases alone. It develops that we are far from indifferent as to the choices made. By examining in detail any systematic pattern of such choices in what is agreed to be common practice, and by formulating generalizations from these patterns that take account of the detailed conditions under which they arise, we may arrive at a guide or a complex of guides to what is probably best under given circumstances, and we may arrive also at a deeper understanding of the nature of traditional tonal harmony.

Ex. 4 shows variant forms of a simple and "correct" chord move-

Example 4.

ment from tonic to dominant harmony, in the same rhythmic setting, with the same melodic pattern where possible, with similar inner parts and registration, unencumbered by ornamental or additional tones, and all involving an initial repetition of the tonic chord in some form. Are there some treatments of this chord succession that are better or worse than others? By what criteria can we judge this, other than by intuitive aural preference? Are any of them to be rejected as defective, and why? Are any of them clearly the best, or probably the best, given the fragmentary circumstances?

Some of these questions can be answered at once on the basis of standard, generally accepted principles. Exx. 4g and 4h require an alteration of the melody and hence do not solve the same problem. They are given solely to include the possibility of a first inversion form following the root position. Exx. 4i and 4j may be rejected as representing poor treatments of the $\frac{6}{4}$ chord. Exx. 4k, 41, and perhaps also 4n, are at least questionable on the same grounds, though acceptable after certain preceding conditions not given. Perhaps this objection to the $\frac{6}{4}$ chord treatments requires more exacting theoretical inquiry beyond the undisputed evidence of common practice.

But how are we to choose among the remaining examples? Is Ex. 4b better or poorer in principle than Ex. 4a when the difference between them consists only in the octave leap of the bass? If we cannot answer this from the limited facts supplied, can we specify conditions in which either the 4a or the 4b form would be definitely preferred? What would be the basis for choice, if there be any, between Exx. 4c and 4g? The general question of the role of inverted chords might be raised here in the form: when would Ex. 4c be better than Ex. 4a, if ever, and why? How many true exchanges of chord form may be said to exist in Ex. 4m? Is Ex. 4m a better solution than Exx. 4n or 4p, and is it always better? When, if ever, ought we to consider the use of more elaborate solutions such as Ex. 4m instead of more direct treatments such as 4c or the even simpler 4b? This order of questioning becomes the subject of our inquiry. Our general task may be stated as the framing of a principle of direction affecting the sequence of units in the motion of similar tonal harmonies.

To focus our attention on a problem of this nature, it is necessary to exclude from immediate consideration many relevant features of tonal harmonic procedure, such as harmonic rhythm, texture, contrapuntal emphasis or overall sonority. But while deliberately attending to certain limited aspects of our data to expedite analysis, we must remain aware of the limitations. Thus we may succeed in clarifying even what we omit. But more pertinently, we may be warned in advance that our limited examination cannot, just because it is limited, result in prescriptions or definitive rules. At best it can result only in generalizations.

The direction of motion in tonal harmony may be responded to as movement forward or movement backward; more precisely, as movement towards a goal, eventually a cadence, or as movement evading or turning aside from such a goal. The forward or goalward movement is

Example 5.

a) Beethoven: Piano Concerto No. 5, Opus 73

b) Brahms: Intermezzo, Opus 76, No. 4

c) Bach: Choral, Valet will ich dir geben

Example 5. (cont.)

d) Brahms: Clarinet Sonata, Opus 120, No. 1, Finale

e) Bach: B-minor Mass, No. 19

f) Costeley (1531-1606): Chanson

properly and commonly termed harmonic progression. The reverse motion may therefore best be called harmonic regression, though in many instances it might be described more correctly as harmonic digression. Reverse or digressive motion on a somewhat larger scale than concerns us here may readily be illustrated by the deceptive cadence, which consists in the deliberate, temporary evasion at a critical moment of the expected goal of a progression.

We should take warning at once that the classification of motion among tonal harmonies as progressive or regressive does not and cannot involve any aesthetic evaluation of such motion. It is not implied that progression is necessarily good and desirable in all circumstances, or that regression is to be avoided. The terms are employed merely as descriptions, which distinguish the kind of motion present in given successions of tonal harmonies. Whenever we judge that either progression or regression might be more desirable, the distinction may provide us with a ready criterion in any choice of alternatives. As we shall see, critical observation will often entail a judgment of the degree of progression or regression. We have suggested elsewhere[1] that it is the existence of a progression-regression dimension, among other and better explored features of harmonic practice, which distinguishes tonal harmony from other possible harmonic procedures as, for example, the directionless successions of isolated sonorities in Ex. 1 above. Regression as such, being an integral part of this tonal dimension, is therefore not to be condemned, but rather to be recognized and evaluated for the musical effect it obtains.

Ex. 5a shows the seventh A^b in the dominant harmony at (1) moving upward, or by regression, to the fifth of the tonic B^b at (2), in such fashion that the suspense is immeasurably increased until the same seventh A^b at (3) resolves normally in the progression to (4). In Ex. 5b, a dominant seventh chord at (1) regresses to a subdominant at (2), which progresses to the dominant again at (3). It is in such situations that we may speak of the first motion as a digression. Regression proper may be seen in Ex. 5c, where the subdominant at (2) occurs between the dominant (1) and the tonic (3). Alterations of dominant forms (1, 3) and subdominants (2, 4, 5) produce a sort of purposeful indecision in Ex. 5d. Ex. 5e shows a remarkably powerful digression to the subdominant harmony at (2) in the otherwise cadential motion (1) to (3).

It is noteworthy that in the period before tonality as we know it was fully developed, otherwise tonal harmonic motion exhibited numerous regressions of this kind, as from (1) to (2) in each case in Ex. 5f. It is likewise suggestive that these treatments are related to a certain indeterminacy of metrical rhythm.

Our concern here is limited to the criteria for judging progressive or regressive motion among tonal harmonies, where these harmonies are similar. It is precisely those circumstances in which har-

1. Norman Cazden, "Tonal Function and sonority in the study of harmony." Journal of Research in Music Education, II: 21-34.

mony remains basically the same which have received the least attention. By motion among similar harmonies we mean the progressive or regressive effect of successive harmonic forms which have broadly the same tonal function, that is, of tonic, dominant or subdominant function. Our initial question may therefore be rephrased: given any two or more successive harmonies having essentially the same role in tonality, in which order will they appear to progress or move forward, and how much so, and in which order will they appear to regress, relax or dawdle?

The question seems to require the establishment of a sort of priority of harmonic forms. Which form should come first to produce the effect of progression? Our attention is better drawn to the reverse aspect: which form should come later or last? The reason for viewing the matter thus is that the essence of progression in time is the feeling of approach towards a goal. Which form, placed nearest to the following goal, will give the more emphatic approach?

In dealing with similar tonal harmonies as we have defined them, the goal towards which they move may be stated simply as the moment of change to another tonal function. The feeling of progression at this moment is necessarily increased by presenting the most decisive change, which is closely related also to the moment of metrical emphasis. For this reason it is useful to designate the last of a progressive series of similar tonal harmonies as the strongest form, and the preceding form or forms as weaker.

The strongest of a pair or series means here the form with the strongest urge or potential towards a significant change of harmonic function. We must be careful not to misinterpret the terms strong and weak as referring to dynamic values of forte and piano or, particularly, to metrical accent. For, in a very real sense, the meaning of a strong harmonic form most often relates precisely to the metrically weak moment, that is, to an upbeat on a small or large scale. It is the change of harmonic function which follows the strong form that both produces and requires the metrical accent. Hence the normal metrical placement for the strongest of several similar tonal harmonies comes immediately before the metrical accent, and it provides a preparation for that accent, being in some measure also its cause.

We may divide the range of similar tonal harmonies into two groups. The first consists of different forms of the same combination of tones, that is, of triad or seventh-chord forms having the same root. Our question with regard to these would be, in a series of two or more harmonic forms having the same root, which order is relatively stronger in a progression towards a decisive change of harmony? The second group consists of triads or seventh chords which have different literal roots, but which fulfill the same tonal function. Our question with regard to the latter would be, in a succession of harmonic forms bearing the same tonal function, which order is relatively stronger in a progression towards a decisive change of tonal function? It will be helpful if we designate members of the first group as forms of the same chord, and note that they normally have all tones in common with each

other, barring octave differences and the possible presence of a seventh; we similarly designate members of the second group as forms of the same harmony in terms of tonal function and note that they may have two or more tones in common.

Turning first to forms of the same chord, we seek criteria for a comparison of any two such forms such that one of them may be termed relatively stronger in its potential towards motion, and hence ought to come later if our objective is progression or forward-tending motion, come first if our objective is regression, temporary relaxation of tendency, evasion or delay.

Since the forms of the same chord, as defined here, have the same root (and we will ignore for now possible differences in such matters as spacing, doubling, or position of the upper or the melodic tones) the different forms may be distinguished by their differing bass tones and the presence or absence of a seventh. In a word, we are dealing with the criteria for determining the priority in time of the various inverted forms, including the root form among these, of a given chord. Which form of a chord, among those in root position, first inversion, second inversion, and possibly third inversion where a seventh is present, is relatively the strongest, and hence ought to come last among several forms to ensure the effect of forward progression?

We may remark here that the achievement of Rameau's principle of the inversion of chords, assigning to these forms the same real or projected "root" or fundamental, consists largely in the deliberate avoidance of this question in order to focus attention on the overriding and more complex problem of tonal function, which the terms of our analysis, taken alone, would otherwise obscure. We do not need to call into question the value of Rameau's results to see that they nevertheless involve certain weaknesses and inconsistencies with regard to our problem here.

Limiting our consideration at first to triad forms only, examination reveals that the root or $\frac{5}{3}$ form of a triad is the strongest; the first inversion or $\frac{6}{3}$ the next in strength; and the second inversion or $\frac{6}{4}$ form very much the weakest. The last portion of this statement requires considerable comment and qualification.

The $\frac{6}{4}$ chord may be termed so weak in our sense, as a representative of its literal or root-indicated harmony, that it does not properly serve for that harmony at all; that is, it does not define a moment of harmonic change. While $\frac{6}{4}$ forms may be included as incidents in the sonorous expansion of a chord, as above in Exx. 4m and 4p at *, they cannot serve well either to initiate the appearance of that chord or to end that appearance. Specifically, we may say that the instances given in Exx. 4i, 4j and 4n are unequivocally poor, and those in Exx. 4k and 4l probably poor unless preceded by other forms of the initial chord. This particular failure of the $\frac{6}{4}$ form in relation to its assigned root is among the striking inconsistencies of Rameau's doctrine of chord inversion, mentioned above. It alone may account for the inacceptibility of the then novel doctrine to such thoughtful practi-

Example 6. Beethoven: Bagatelle, Opus 126, No. 1

tioners as J. S. Bach.

It may be objected here that we have disavowed any intention of setting up criteria for the aesthetic evaluation of harmonic procedures; further, that in our own terms such passages as Exx. 4i, 4j and perhaps 4n may be deemed acceptable if the desired objective happens to be regression, which was declared admissible, while Exx. 4k and 4l would seem to fit our requirements for progression, though they would not thereby be automatically preferable.

Instances of precisely such effective use of the $\frac{6}{4}$ chord as an isolated realization of its literal or root-indicated harmony may indeed be adduced in excellent musical passages. Several such treatments are seen in Ex. 6 in which the moments marked (1), (4), (6), (7), (9), and (10) are pertinent, the $\frac{6}{4}$ chords at (2), (3) and (5) being transient. It is evident that the influence of pedal treatment at moments (1) to (5), and a contrapuntal emphasis from (6) to (10), serving to isolate the bass line, act to contravene even so distinct a weakness as we have indicated in the $\frac{6}{4}$ form. There can be little doubt that this treatment is deliberate as well as experimental, or that it is carried out with consummate skill here and in other mature works of Beethoven. Probably the best clue to the role of the chords in question comes in the close parallel those at (6), (7) and (9) bear to the moment marked (8); each has a suspended character, the last resulting in an extended suspense that remains to the end of the composition.

But such seeming difficulties and possible contra-indications of our classification serve, not to detract from the generalization following from widely observed phenomena of common harmonic practice, but rather to warn us again that we are not dealing with absolutes, that our phenomena are not static, that they can never be wholly isolated from the concrete conditions manifested in musical compositions, and that we therefore cannot prescribe rules-of-thumb to fit all possible situations. On that account, however, we need not abandon all attempts at understanding or conclude that no rational principles of this order may obtain in the art of music. We do not discard the elementary principle of functional tonal harmony, namely that the dominant harmony moves towards resolution in the tonic harmony, merely because numerous cases may be demonstrated in which a dominant is taken elsewhere.

We must again emphasize, beyond misunderstanding, that we are dealing here with the $\frac{6}{4}$ chord as a form of its root-indicated harmony only. This form indeed occurs rarely, unless as an incident in the sonorous expansion of the chord, where the $\frac{6}{4}$ form is neither the first nor the last sounded and has no metrical emphasis. In the numerous transient forms of $\frac{6}{4}$ chord treatment, as for instance in Ex. 6 at (2), (3) and (5), it is not so much a chord, in any functional sense, as a temporary juncture of lines. And of course, in its prominent accented use, the $\frac{6}{4}$ chord is not a form of its root-indicated harmony at all but a combination of non-harmonic superstructures belonging to a different harmonic function. That is, the accented chord form G-C-E is not a tonic form in the key of C, but a dominant form, and in our classifica-

Leaving the difficult problem of the $\frac{6}{4}$ chord here for the present, let us observe the indications of the relative strength of the remaining forms of a single triadic chord. By designating the root form as stronger than the first inversion, it follows that Ex. 4c above has more effect of progression than does Ex. 4g, and so also do Exx. 4m and 4p. The distinction is more striking if we attempt to alter the metrical placement of the two chord forms. In Ex. 4d, the emphasis and duration given the root form seems more natural and acceptable than a similar treatment of the first inversion in Ex. 4h.

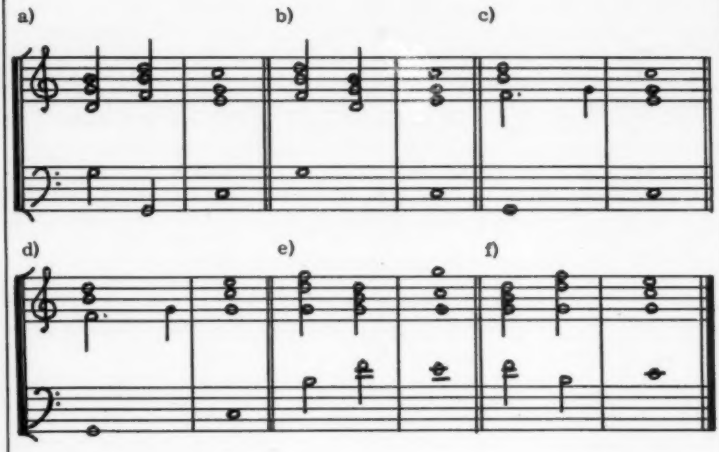
Our judgment here ought not to be taken, however, as a demonstration of any inferiority or objectionable quality in regard to the first inversion. There is, for example, nothing inappropriate about the treatment in Ex. 4f, where only the $\frac{6}{3}$ form appears. The meaning of our criterion in practice is simply that if we wish to have the $\frac{5}{3}$ and $\frac{6}{3}$ forms of a single chord in succession, putting the $\frac{5}{3}$ form second will produce a more urgent forward motion, while the reverse will possess less drive. The latter treatment may well be the more desirable one in a given case, let us say in the situation of a dominant harmony moving to a tonic harmony (Ex. 4q) when a more decisive cadential effect is being withheld for later use.

Before leaving triadic forms, we should deal with other possible influences on the relative progressive impulses of similar chords. Suppose the bass tone, affecting the inversion form, is not altered in repetition of a chord, but motion occurs in other constituents. What would be the criteria for increasing strength, that is, for a feeling of progression?

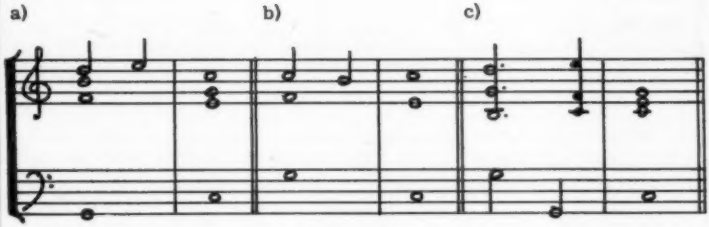
Even in this narrow framework, distinctions may be observed by testing various successions. It may be shown that motion of the melody, and/or motion of other chord tones, is more progressive than simple repetition. Ex. 4a above is therefore more forward-tending than would be a mere repetition of the same chord form, though previously established metrical patterns may affect this. Motion of the bass by an octave, which does not change the inversion, is also stronger than repetition of the bass; Ex. 4b is more progressive than Ex. 4a. The greater the amount of motion, and the greater the number of parts involved, the stronger becomes the progressive effect. Finally, motion of the upper parts contrary to the bass increases the forward potential. Ex. 14a shows many of these effects in action.

We come next to the "addition" of a seventh to a chord. Very simply, the introduction of a seventh where it was previously absent has a progressive effect (Ex. 7a), while the omission of a seventh which was previously present (Ex. 7b) produces a weakening of momentum, or regression. The regressive motion is peculiarly useful where the seventh of the chord itself moves to the octave before resolution; that is, where the octave tone of the chord is treated as a "non-harmonic" escape tone (Ex. 7c). The paradox of an octave relation to a chord root being heard as a non-harmonic relation finds its solution in just

Example 7.



Example 8.



Example 8. (cont.)

such cases. If there be any doubt of this action, let us observe how in Ex. 7d the failure to resolve the octave tone seems distinctly faulty. However, the effect of Ex. 7b is not dissimilar from that of Ex. 7c when sounded on the piano, because the unclarity of voice-leading on that instrument results in an implied escape tone effect that is not discernible in the notated form.

In establishing a heirarchy of strong and weak forms among the various inversions of seventh chords, once more the root position is the strongest, and the second inversion very much the weakest. The third inversion tends to have a somewhat stronger moment than the first inversion, mainly because it leads to a change of harmony that is itself partly unstable or active (Ex. 7e). However, motion directly from a third inversion to a first inversion (Ex. 7f), while regressive, is not prominently so, because of the counteracting progressive elements in the voice-leading, particularly in the bass line, and the active potential remaining over at the moment of resolution when the initial chord-seventh in the bass has not resolved in a direct line.

Triad or seventh-chord forms may also contain non-harmonic tones. With regard to these, it may be stated very simply that the addition of such tones not previously present is progressive (Ex. 8a), while their resolution within the chord is relaxing or regressive (Ex. 8b). The escape-tone, exchange-tone (cambiata) and anticipation are all progressive in this sense, while the suspension and appoggiatura are correspondingly regressive. Passing tones and auxiliary (neighboring) tones do not appear to influence the moment, or potential towards motion, of a chord; though auxiliaries are inherently digressive in nature, but in linear rather than harmonic terms.

Where more than one non-harmonic tone appears in a chord, the chord form containing the most non-harmonic tones is the strongest; therefore its placement last in a series has a progressive or forward urge. Ex. 8c shows such a combination of anticipation treatments. The non-harmonic implication of the octave to seventh motion is also in evidence here and is in accord with our estimate of the progressive role of the introduction of the seventh. The ninth of a chord (Ex. 8d) is accorded a non-harmonic resolution, regressive in effect, more commonly than the seventh.

A partly progressive, partly regressive treatment may be seen in Ex. 8e. The addition of the seventh, not previously present, followed by the introduction of the non-harmonic anticipation, are both of forward moment. But the non-harmonic treatment of both octave and sixth in chord (1) makes its resolution movement relaxing or regressive. This last type of motion is instructive for the understanding of the well-known accented $\frac{6}{4}$ chord, which is distinctly analogous.

In Ex. 8e, the $\frac{6}{3}$ form in chord (1) has the literal appearance of a first inversion of a chord on another root. However, the determining aspect of tonal harmony is not the constitution of a chord, but its function. We are concerned not so much with what the chord or its structural tones are, but with what they do. Here the sixth of the

chord acts precisely in the manner of an accented non-harmonic tone, i.e. an appoggiatura.

In a similar setting (Ex. 8f), the fourth in chord (2) shows the same kind of appoggiatura action, though it does not give the impression of belonging literally to a differently rooted harmony. It is well accepted that in such a situation, the combination of these appoggiaturas of the sixth and the fourth, and perhaps even of the octave as well (Ex. 8g), gives a literal construction termed a $\frac{6}{4}$ chord at (3), whose theoretical root is designated by Rameau's principle as a fifth below the bass. Yet the action of the constituent tones in chord (3) is precisely that of a collection of appoggiaturas, each of which might have been led, in more gradual (regressive) resolution, to separate destinies as such (Ex. 8h).

Correlating the well-recognized nature of the accented $\frac{6}{4}$ chord with our criteria for determining the relative strength of forward potential, it follows that, as with other appoggiatura treatments, the resolution of this chord as a whole is regressive or relaxing. We may go further to suggest that, in general, the resolution of any metrically accented harmony is inherently regressive in our sense, though in given cases an accumulation of other strengthening factors may counteract the full weight of this tendency. This is not the place to pursue the converse principle that metric accent is itself a concommitant of resolution tendency.

Thus it comes about that the $\frac{6}{4}$ chord which occurs merely as an incident in the expansion of its literal-rooted chord is very much the weakest possible form of that chord, but the very different $\frac{6}{4}$ chord consisting of a conjunction of appoggiaturas resolving to a chord rooted on the same bass tone is on the contrary a strong form of that chord, stronger than the root position of the chord itself. In short, chord (4) in Ex. 8h would be an impossibly weak rendition of a C chord, but it acts as a stronger form of the G chord than the G chord itself.

This interesting result suggests that it may be beneficial to examine the effect of a $\frac{6}{4}$ chord when it serves as a strong form in the latter fashion, yet bears no accent. Such is the case in Ex. 8i, where the $\frac{6}{4}$ chord results from a combination of anticipations, and in Ex. 8j, where it results from a combination of escape tones. In both cases it is a strengthened form of the preceding chord and not a feeble treatment of the following tonic. Rarely has attention been called to such potentially progressive treatments of the $\frac{6}{4}$ chord, though its regressive use when it falls on the metric accent is common knowledge and common practice. The unusual treatments in Ex. 6 at (1), (4) and (10), partake of the anticipation quality; those at (3) and (5) combine the escape-tone and exchange-tone effect. The $\frac{6}{4}$ chord at (6) acts like an appoggiatura, and, like those at (7) and (9), produces the relaxing moment apparent also in the suspension at (8). The rarity of treatments such as those in Exx. 8i and 8j is probably due to their equivocal value in any but the most sensitive metrical balance; the sonorous resemblance of the $\frac{6}{4}$ form to the tonic following it reacts against a decisiveness of functional harmonic change. Similar placement of a $\frac{6}{3}$ chord

Example 9.

Example 10.

(Ex. 8k) produces more resolution potential through the retention of a leading tone, but this also reduces the linear activity. These less common, yet technically correct treatments, provide a measure of the possible usefulness of the criteria of relative moment for the understanding of tonal harmonic procedure.

Chromatic alterations in a chord have very much the same influence on its forward urge as non-harmonic escape-tones, exchange-tones or anticipations. They have the added strengthening potential, however, of a more definite directive towards resolution, and consequently this resolution had best be soon. In Ex. 9a the upper line presents an escape-tone motion, but so far as our expectations are concerned it might have proceeded equally well in the manner of Ex. 9b, in which event we would term it anticipation treatment. The raising of a tone chromatically, as in Ex. 9c, is stronger than either in progressive impulse in that the outcome of the chromatic tendency tone, and in this instance also of the expanding moment of the augmented sixth relation, is more determinate; though not absolutely so, as we observe in Ex. 9d. More than one chromatic alteration induces a correspondingly more intense progressive effect (Ex. 9e), which may be too strongly flavored for more modest styles. In Ex. 9f, the regressive resolution of the chromatic at (1) is countered by the progressive role of another at (2).

The multiplicity of influences which affect the progressive moment of a single chord brings to light a further stage of our problem. Beyond comparisons of the relative strength of two forms of the same chord, what happens if we take a longer series of similar forms, in a sequence that should yield a continuously increasing potential?

Ex. 10a shows such a series, in which the forward urge becomes increasingly powerful as we proceed from chord (1) to chord (7). We observe at once that the factors increasing the progressive impulse are not the same in each motion, and also that more than one significant factor may occur at each stage. Thus the motion from (1) to (2) involves both a drop of the bass and a contrary movement of the upper parts; the motion from (2) to (3) involves a change to root position and also contrary movement between the bass and the upper parts; the motion from (5) to (6) involves both a change from first to third inversion and the introduction of a chord ninth; and so on.

This complexity is present even though the example is clearly an artificial construction. We may therefore suspect that the simultaneous operation of several of the significant factors is apt to occur in much greater variety and in higher degree in the practice of musical composition. But let us follow out our indications of relative chord potentials all the more rigorously, and more subtly too, by limiting the mutation of similar chord forms to a change of one element at a time where possible (Ex. 10b). The result is instant disappointment; it hardly sounds like music at all. Why?

In such a series of harmonies, a gradually increasing forward moment is still in evidence. However, the decisiveness of each change

is impaired, and not in equal degree. In particular, the slightness of pace in the changing impulse has a notably deleterious effect on the metrical values, so that there is little conviction in the normal metric accents of these measures, right up to the last. Revaluation of the duration or of the metric placement of the chord forms, in the manner of Ex. 10c, shows some possibility of improvement in this respect. But the overall impulse remains weak and static despite such improvement. Continuing such a passage, or repeating it, can very quickly become unbearable; our progressive potential here seems to consist in an almost irrepressible urge to move on to something else, almost anything else.

So poor a result shows simply that subtly graduated and continuous progressive motion is neither especially advisable nor likely to resemble known musical practice. It may be useful for purposes of classification to arrange a long series of similar chord forms in progressively stronger heirarchy. But slow gradation of increasing impulse towards forward motion is far from desirable in aesthetic terms. Gradualness is in general no part of art in which even the deft touch must rely on clear differentiation and contrast. A graduated series has its appeal for the theorist, and its oversimplified neatness may trap him into mistaking the process of codification for the processes of living art. Such hasty assumptions and application have much to do, for example, with the inadequacy of Hindemith's views about "harmonic tension" or about mode differences[2].

In the practice of tonal harmony, the most effective and convincing motion does not come about through subtle or gradual change of moment, but rather through change sufficiently significant to create maximum clarity. This does not imply that small scale or inconspicuous changes are always to be avoided, but rather that they are judiciously placed, with due regard for rhythmic values, at the more transitory, relaxed or quietly undulating passages; and that they are juxtaposed in this against more striking, sudden and dramatic infusions of harmonic potential, wherever such contrast is deemed desirable.

Variation and flux, and temporary regression or digression as well, in motion towards the moments of decisive harmonic change, and among these moments, are necessary ingredients in the processes of tonal harmony. Contrariwise, nothing in the organization of tonality, whose essence lies in the sharp opposition and interaction of harmonic functions, of modal qualities, of consonant and dissonant moments, of downbeats and upbeats, suggests that successions of similar harmonies ought to follow a mechanical gradation or insipidity of progressive sequence.

We have now to consider the second group of similar tonal harmonies, those which have broadly the same tonal function, as tonic, dominant or subdominant, but which do not have the same literal triadic root. It may be observed in general, first, that the roots of the

2. Norman Cazden, "Hindemith and Nature." Music Review XV: 288-306.

Example 11.

"secondary" harmonies with similar tonal function are a third lower or higher than the roots of the "primaries" whose function they fulfill; and second, that the actual function of the "secondary" forms is not fixed or absolute for all conditions, but is on the contrary flexible and often equivocal. Perhaps consideration in the light of the principle of direction may help to clarify the uncertain role of secondary harmonies.

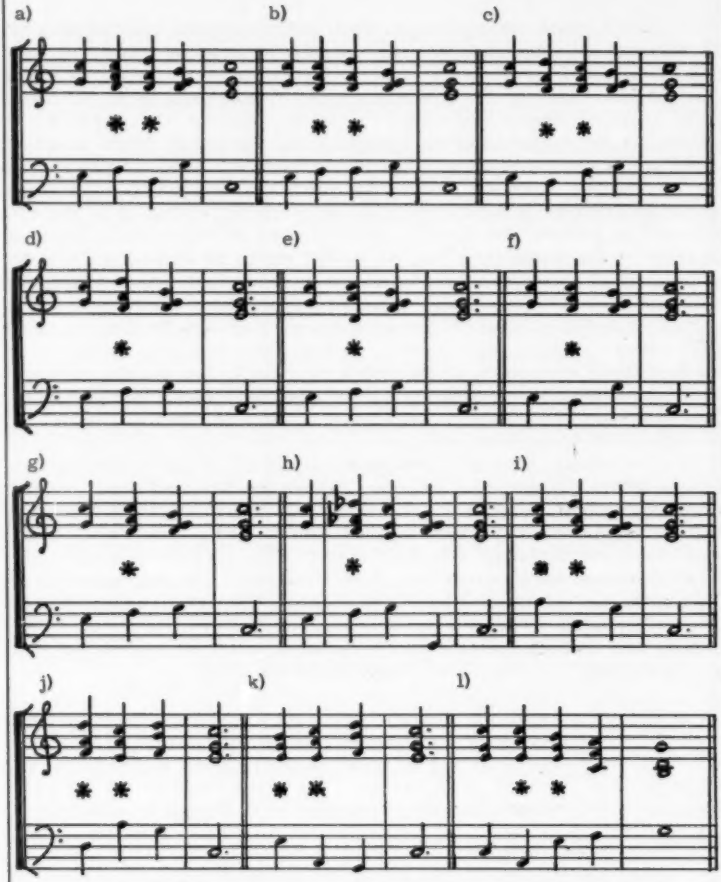
In the usual classification, each primary tonal function of a key is taken to be expressed or represented by a given triad: the tonic function by the I chord, the triad formed with the first scale-tone as root; the dominant by the V chord, and the subdominant by the IV chord. It is accepted that a tonic effect may be obtained also from the VI chord, as for instance in its accepting the resolution of the dominant at (2) in Ex. 11a; that a strongly subdominant role is usually evident in the use of the II chord, as in the same example at (1); and that a dominant function is commonly fulfilled by the VII chord, as in Ex. 11c, and on this account the chord is often termed an "incomplete dominant seventh." The secondary role of the III chord is somewhat less determinate; in some situations it seems to have a tonic function (Ex. 11e) since no dominant form would appear to progress to the following subdominant, while in other situations it sustains an equally definite dominant character (Ex. 11g) in its urge towards resolution to the tonic. Each of these analyses may be tested by substituting the declared primary form of each function for the secondary form, by comparing Ex. 11b with 11a, 11d with 11c, 11f with 11e, and 11h with 11g.

It is not so commonly observed that the VI, II and VII chords may each undergo a transfer of function, just as the III chord does. The VI chord may be treated as a subdominant (Ex. 11i) in a setting where the IV chord might readily be substituted (Ex. 11j); the II chord, as in Ex. 11k, may have the same action as the VII_7 (Ex. 11l) or even the complete dominant ninth chord (Ex. 11m); and the VII chord, particularly when given an appropriate bass and doubling (Ex. 11n), may produce a distinctly plagal effect akin to that of the subdominant proper (Ex. 11p). Comparable transformations may be obtained for further derivatives of the "secondary" chords, such as the II^6_5 or the VII_{7b}.

These instances merely emphasize anew that the determining aspect of tonal harmony is not the constitution of chords but their tonal function. Our understanding of tonal harmony must therefore hinge, not upon what a chord is in terms of its pitch constituents or other features of its overall sonority, but upon what it does in relation to a key center.

It follows that any evaluation of similar tonal harmonies from the standpoint of their relative potential for progressive or regressive motion must take into account the inherently flexible functional roles of the secondary harmonies; and we may add, perhaps in certain cases, even of the primary ones. The problem is by no means insuperable, and the principle of direction may also prove useful as an explanation of our intuitive judgments of tonal function of the secondary harmonies in given situations.

Example 12.



Let us return to the first observation regarding similar tonal harmonies having different literal roots, namely, that the roots of potentially secondary forms are a third higher or lower than those of the corresponding primary forms. It is noteworthy that in some instances this definition may be extended to include secondary roots that are two thirds higher (Ex. 11k) or two thirds lower (Ex. 11n) than the roots of the equivalent functional primaries (Ex. 11m and 11p).

Now we may obtain a criterion for progressive or regressive motion of similar tonal harmonies with different literal roots in a very simple form: change of root to a third lower is progressive; change of root to a third higher is regressive. The simultaneous change or lack of change of the bass tone, as distinct from the theoretical root of the chord, has precisely the same influence on the relative potential towards forward motion as posited with regard to inverted forms of chords on the same root. Of specific pertinence, this will mean that in all cases the root position of a chord is its strongest form, and that motion of the bass is more progressive than a static bass. The influence of the addition or removal of chord sevenths or ninths, non-harmonic tones or chromatic alterations remains as previously stated, addition being progressive and removal regressive.

Thus, in Ex. 12a, the motion from IV to II is progressive. The motion from IV to II_6 is less so because the first inversion of the II chord is not as strong in potential as its root position, and because the inaction of the bass is less progressive than its motion down a third (Ex. 12b). On the other hand, the motion II to IV (Ex. 12c) is distinctly regressive. Taken singly, the II_6 (Ex. 12d), II^6_5 (Ex. 12e) and II_7 (Ex. 12f) are each of stronger impulse than the ordinary IV chord in the same situation (Ex. 12g), and increasingly so; while the chromatically altered treatment (Ex. 12h) is clearly the most emphatic of all.

These classifications may help resolve the well-known paradox that the supertonic harmony or II chord sustains a stronger subdominant action than does the proper subdominant or IV chord itself. We cannot pursue here the implied question as to whether true functional harmonic change does not itself result from a more extreme degree of the progressive effect of the motion of chord roots down a third; i.e., the motion of <u>two</u> thirds down at once, as in the change from II to V or V to I, and the motion of <u>three</u> thirds down in the change from IV to V. That this interpretation has some validity, even though it is clearly not the entire explanation, may be observed from the notably progressive impulse of root motion down <u>two</u> thirds between such chords as VI to II (Ex. 12i) or III to VI (Ex. 12k), as compared with the regressive effect when these motions are reversed (Exx. 12j and 12m).

We must repeat here the caution that the strongest among the forms of a given harmony is by no means the most desirable under all conditions. Some of the instances in Ex. 12 are illustrative of the need for balanced judgment of the total sequence of harmonies. Thus Ex. 12f contains stronger action than Ex. 12e, but because of this the indicated metric accent is contradicted, and the treatment is otherwise too high-

ly powered unless used at a rather important cadence. Comparable over-weighting appears in Ex. 12k, where some regressive motion as in Ex. 12j would be more suitable. Ex. 12c and 12l also suffer from metric distortion due to the initial strong progression, and Ex. 12i shows a treatment best reserved for slow and weighty passages. The principle of direction may therefore not be interpreted as a facile directive. As befits a sensitive analytical tool, it needs application with careful judgment of the concrete needs of particular motions of harmonies.

But how can we reconcile the understanding of the principle of direction of motion among similar tonal harmonies having different roots with the acknowledged uncertainty as to whether these harmonies are indeed similar with respect to their tonal function? The answer here lies largely in a further examination of the values of gradual as compared with significant change of potential. Stated generally, gradual or subtle alteration of potential towards motion, all the more so if continuously in the same progressive or regressive direction, produces a relatively static quality and innocuous loss of impulse, chiefly rhythmic in nature. Greater contrast, or leaping between levels of increasingly progressive potential, with occasional regressive effects interspersed, is more apt to result in a satisfying drive towards a harmonic goal and a metric accent as well. Some non-tonal procedures for successions of harmonic sonorities, even when constituted of strongly flavored or intense combinations, show weakness in this respect. The most notable symptom of such weakness is an unclarity or lack of conviction in rhythmic impulse, and this is not to be remedied by ever so great an increase in tension or extravagance in the individual sonorities involved.

Compared with functional changes of harmony, as when chord roots move down fifths or sevenths, the motion among differently rooted chords with similar functions is relatively mild or gradual, even if progressive. If we examine the effect of a continuing series of such related chords, we find that such a series does eventually lead to changes of tonal function, but also that these changes come unobtrusively and by small stages. In the common series of Ex. 13a, chord (2) is a stronger [I] tonic form than chord (1), and is reached by progressive motion. But it also makes for a weak means of transition into the subdominant function of chord (3), for chord (2) is a weak or regressive subdominant as well as a strong or progressive tonic harmony. This situation may therefore hold the answer to our problem of equivocal role in secondary harmonies. Chord (2), the VI chord of the key, may be viewed either as a strong tonic form or as a weak subdominant form, and it occurs in this setting as a transition between the two, slipping smoothly and quietly between the one function and the other. Such smooth passage, compounded by a retention of the common tones in the process, reacts against a clear opposition of the fundamental tonal functions. Even when chord (4) is reached, nothing very much seems to have happened, harmonically, as compared with the more dramatic and necessarily accented change from chord (4) to chord (5).

If the entire procedure in Ex. 13a be condensed through elimina-

Example 13.

Example 14.

a) Rameau: 2me Menuet, from Suite No. 2, Pièces de Clavecin (1731)

Example 14. (cont.)

b) Mozart: Violin Sonata, K. 301

c) Schumann: Dichterliebe, Opus 48, No. 7

tion of root motion by thirds, as in Ex. 13b, much greater power is obtained. On the contrary, if a graduated series of root motion by thirds upward be constructed, as in Ex. 13c, the motion is so feeble, by dint of being both consistently regressive and gradual, that it can hardly sustain even a static impulse, and the intermediary bar-line seems quite gratuitous too. Such a passage can produce an alarming sensation of moving backwards.

Ex. 13a, while covering more slowly the same range of motion as summarized in Ex. 13b, is neither so gradual nor so persistently mechanical as to warrant objection. Further, the differentiation here between the more subtle and transitory shifting of harmonic impulse in Ex. 13a and the more sharply outlined contrasts of Ex. 13b does not imply that the latter is a better treatment. On the contrary, there is need for both types of procedure, and for variants of both. Ex. 13a contains an inner change of momentum which is gradual in chords (1) to (4), more sudden in the motion (4) to (5), partly regressive in chords (5) to (6), and entirely regressive in chords (6) to (7). There is, in a word, constantly varying nuance in the quality of motion. The series is somewhat mechanical and schematized in that the motions from (1) to (4) are all of the same kind, in that only triads in root position occur, and that rhythmic variety or melodic interest is excluded. Nevertheless the whole series seems eminently normal and satisfactory. Conversely, the more concentrated changes of function in Ex. 13b, while equally "correct" in the framework of our expectations, may well be over-loaded with important shifts in rapid sequence.

These two trends, the one including a variety of gradual and urgent progressions and regressions, the other consisting of flashing oppositions of the strong tonal functions, each have their specific usefulness in the procedures of tonal harmony. It may even be predicated that the first of these tends to predominate in phrase openings, while the second is characteristic of cadences and may well be what we mean by cadence.

Exx. 14a and 14b illustrate judicious treatment in very different styles of progressions involving the same chord. In Ex. 14a the motions between chords in root position and in first inversion are highly plastic on a small scale, and clearly progressive on a larger rhythmic plan, while the increasing motion of the parts accumulates potential towards the functional change of the last measure cited. Ex. 14b shows the normal placement of different inverted forms of a simple triad. The $\frac{6}{4}$ form comes on a weak beat as a sonorous extension of the opening triad, and the stronger root position comes just before the change to a different harmonic function.

Ex. 14c shows three successive forms of subdominant harmony in progressive sequence, in still another historical style. The reality of the principle of direction may be judged readily by the distress that would result if any of these passages were to be sounded in reverse time sequence.

In applying the principle of direction in the motion of similar

tonal harmonies, several preliminary judgments are needed for any specific decision. It must be judged whether variant treatments of a single chord are advisable, or a variety of functionally similar but distinct chords, or the larger changes of function; and it must be judged when each of these possibilities is to occur. The variety of circumstances which lead us to choose in one situation a decisive change of function, in another a change of form but not of underlying role, and in yet another the maintenance of a single chord still admitting lesser fluctuations, is a clear indication that the analysis discussed here explores certain detailed and perhaps neglected aspects of tonal harmony, but cannot be taken as a directive or prescription for the practice of harmony.

Similarly, classification of similar tonal harmonies in terms of their relative potential towards forward motion cannot automatically determine how these harmonies are to be used. We have to determine in each instance whether progression or regression is desirable, whether a notable or a slight degree of either is warranted, how long and in what rhythmic form the action should be maintained, whether the degree of motion sought remains within the range of forms given in a single chord, and the exact balance of often conflicting impulses appearing within one succession, many types of motion involving combinations of progressive and regressive ingredients of differing importance.

Exact evaluation of individual cases is by no means determinate in the abstract through the mechanical application of the criteria established here. The usefulness of the principle of direction lies in its application as a general framework for judging quickly that such-and-such a succession of harmonic moments has too much, or too little, impulse for progression or regression; for suggesting directly what alterations may change the degree or modify the nature of the inadequate harmonic movement under consideration.

The principle of direction and the classification of relative moment in variant forms of similar tonal harmonies may therefore prove of value mainly as a critical tool. Where a harmonized passage seems ineffectual and yet all observations indicate that it is quite "correct" (in apparent agreement with isolated features of common practice), this principle and classification may serve for rapid diagnosis of the source of the observed weakness and for positive indication of the most fruitful direction in which to seek alternatives.

To sum up, we may establish as a characteristic of the action of tonal harmonies that their sequence in time is ordered, not merely in terms of simple succession, but also in terms of a principle of direction. This principle of direction gives to some successions an increasing urge or forward motion towards a goal. We term such a succession a harmonic progression. Other types of succession produce the effect of hesitation, relaxation of trend, or motion temporarily away from a goal, which goal is at the same time indicated by the total orientation to tonality. We term such types of motion regression or digression in accordance with their circumstances.

With regard to successions of harmonies of which all retain the same fundamental function within the given tonality, i.e. similar tonal harmonies, we define the goal towards which they move as the moment of significant change of tonal function. Such harmonies may have the same root, or they may have roots related at the distance of a third higher or lower. For such similar harmonies, we may determine whether their succession will be responded to as progressive or regressive and in what degree. We term the second of any two successive harmonies in a progression, and the last of any longer succession, the stronger, meaning stronger in its potential towards decisive motion.

In evaluating the relative potential towards forward motion or progression, the following features of similar tonal harmonies are significant:

1. Within movement among chords having the same root and the same bass tone, the strongest motion is that of all chord constituents contrary to the bass; the next strongest, motion of several constituents; next, motion of the bass by an octave; next, motion of the melodic tone; next, motion of an inner part; and weakest, simple repetition;

2. For chords with the same root, the form with the root in the bass is the strongest; the $\frac{6}{3}$ or first inversion form next strong; and the $\frac{6}{4}$ or second inversion very much the weakest;

3. For chords with the same root containing a seventh, the presence of the seventh in any form makes the whole stronger; the seventh chord with the root in the bass is the strongest, the $\frac{4}{2}$ (third inversion) and the $\frac{6}{5}$ (first inversion) forms less strong in that order, and the $\frac{4}{3}$ or second inversion form very much the weakest. By extension, a chord ninth will influence the progressive quality of chord motion in much the same way as, and in addition to, the influence of a chord seventh;

4. Where non-harmonic tones appear during the sounding of a chord, the addition of or motion to an escape tone, exchange tone or anticipation is progressive or strengthening; the resolution of a suspension or an appoggiatura is regressive or relaxing; and the use of passing tones or auxiliary tones of no special effect;

5. Chords containing chromatic alterations, or further chromatic alterations than previously present, are stronger than the same chords in natural form;

6. For chords having similar tonal function but not the same literal roots, motion of chord roots down a third is progressive, and motion of chord roots up a third is regressive.

In applying this principle and classification to the practice of tonal harmony, it is observed that:

1. The progressive or regressive effect of motion between any two forms of similar tonal harmonies is not necessarily the same in

degree, and the degree must therefore be judged in each concrete instance;

2. In most instances, a number of factors affecting the relative forward potential of chords in motion will be present at the same time, and some of these factors may operate counter to, or cancel, the impact of others;

3. In extended successions of tonally oriented harmonies, there is no musical value in schematized gradualness or consistent subtlety of continuous progression or regression;

4. On the contrary, musical impulse is best achieved either by very great or sudden changes of potential, the placement of which are guided chiefly by rhythmic considerations; or by a wide variety of slight and significant changes of potential, including negative or regressive motions, with the more significant changes tending to accumulate towards cadences.

It is hoped that the stated principle and its realizations, with the examples given, will prove helpful as practical tools for criticism and guidance of harmonic practice, contributing to a further understanding of the nature of tonal harmony and indicative for the analysis of non-tonal procedures.

JOHANN MATTHESON ON AFFECT AND RHETORIC IN MUSIC (II)

by

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Concerning the Disposition, Elaboration, and Decoration of Melodies
(Selections from Part II, Chapter XIV)

1. It is often thought that a little inventive ability suffices for composition. This, however, is not true. Invention itself is not enough even though it may solve half the problem, for [it is true that] there must be invention to begin with. A good beginning is half the job. There is a proverb that says, "All's well that ends well." To fulfill it, disposition, elaboration, and decoration — in terms of rhetoric, dispositio, elaboratio, et decoratio — are necessary.[71] While these terms have been mentioned above, a fuller explanation follows here.

2. There are many who begin something with such generosity that they cannot keep it up. Horace complained about this already in his day when he said, "It was begun as a wine-jug and ended as a water-pot."* There are many examples of composers who have a wealth of invention, but whose fire always goes out very quickly. They neglect to dispose their material carefully by never giving it a thought and thus they never work out anything and cannot keep anything up to the end. Marcello knows better than this, as we shall soon see.[72]

3. Other composers pick up whatever inventions they come across; usually only the smallest part of them is their own. However, they are clever and dispose, elaborate and decorate their plagiarisms so well that it is a pleasure to watch them at work. If I had to make a choice between good invention and clever elaboration, etc., I might choose the former. I should prefer, however, to have both at the same time. This combination of qualities, alas, is as rare as a person of both beauty and virtue.

4. First, let us consider disposition which consists of the nice ordering of all the parts and circumstances of a melody or an entire work. It is somewhat similar to a building plan, which is drawn, designed, and sketched to show where a hall, a room, a chamber, etc.,

71. The meaning of these terms will become clear in the course of this chapter.

* Amphora coepit instituti; currente rota cur urceus exit?
Horace, Ars poetica, v. 21.

72. Mattheson chooses an (unidentified) aria by Benedetto Marcello to illustrate the points he wants to make in this chapter.

shall be placed. Musical disposition differs from rhetoric only in its medium,[73] for it must observe the same six parts as does a speaker: introduction, narration, proposition, confirmation, argument, and close; [i.e.] exordium, narratio, propositio, confirmatio, confutatio, et peroratio.

5. The earliest composers gave just as little thought to the above order as did the untutored naturally gifted speaker before rhetoric became a formal science and an art. In fact, despite its correctness, the result of anxiously following and measuring one's work by this schoolbook method would often be very pedantic. It can, nevertheless, not be denied that in the careful examination of good speeches as well as good melodies one can meet these parts — or, at least, most of them — following each other in good sequence; despite the fact that most of the authors would as soon have given thought to their death as to such guides. This is especially true of musicians.

6. Even in common conversation nature teaches us to use certain tropes[74], certain suggested meanings of words, certain arguments or reasons, and to keep them in some order even though the speaker may never have heard of rhetorical rules or figures. This very natural mental instinct, which causes us to present everything in good order and form, has given certain clever heads the basis for their rules. Up to now the outlook in this respect has been dark in the field of music. We hope that it will gradually grow lighter and we shall try to make a contribution toward this goal.

7. Exordium is the introduction and beginning of a melody in which its purpose and intention are shown in order to prepare the listener and to arouse his attention. In a movement without instruments, for voice and bass only, the introduction is very often contained in the prelude of the thorough-bass. When there is more than this accompaniment, [the introduction] is found in the ritornello. We call ritornello the part first played by the instruments, since it later serves as a return [Wiederkehr] and may close as well as open the movement.

8. Narratio is, as it were, a report, a tale in which the meaning and nature of the delivery is suggested. It is found at the entrance of the vocal part or the outstanding concertato-part [vornehmste Concert-Stimme] and is related to the preceding exordium by means of a clever connection.

9. The propositio, the proposition itself, briefly contains the meaning and purpose of the musical speech. It is of two kinds, simple or compound. Here we must mention colored or ornamented [verbrämte] propositions, which belong to music exclusively and are unknown in rhetoric. Such propositions have their place immediately

73. Vorwurff, Gegenstande oder Objecto.

74. Mattheson uses the word tropos. The English cognate is "trope" which as a rhetorical term means "a figure of speech; the use of a word or expression in a figurative sense." Webster's New Collegiate Dictionary, 1950, p. 912.

following the first paragraph [Absatz] of the melody, where the bass, as it were, takes the lead, and presents the subject [of the musical speech][75] briefly and simply. Thereupon the vocal part begins its propositio variata, unites with the bass, and thus creates a compound proposition. Later we shall look at an aria with this in mind, and thus see whether it fits this outline. That will make everything we have said here much clearer to both eye and ear, although it may now be new and strange.

10. Confutatio is the resolution of objections.[76] In music it may be expressed by means of ties [Bindungen] or by the citation and refutation of apparently foreign passages. Such contrasts, carefully used, are a special source of aural pleasure. Everything that goes against the proposition is resolved and settled. This part of disposition, although it is one of the most beautiful, is not found in music very often.

11. Confirmatio is the clever reinforcement of the proposition and is brought about in melodies by means of surprising repetitions (by which we do not mean the ordinary reprises)[77]. What we have in mind are agreeable passages repeated several times with all sorts of nice variations. This will be shown later in the example.

12. Peroratio, finally, is the end or conclusion of our musical oration and must, above all else, be especially moving. The conclusion is found not only in the melody itself, but most often in the postlude [Nachspiel], whether for bass or for many voices, and whether this ritornello has been heard before or not. It is customary that the aria concludes with the same material with which it began. This, consequently, serves as peroratio as well as exordium.

13. Here, too, a clever composer can often agreeably surprise his listeners by making unexpected changes in the close of melodies as well as in the postludes. They will make a very pleasant impression and thus give rise to the special emotions that correspond to them. That is the real purpose of the peroration. The kind of close that breaks off suddenly, ex abrupto, also serves as a useful means of arousing emotions.

14. As proof of the above statements let us examine an aria by Marcello. It will be a model according to which one can examine all other melodies with regard to their disposition, for although not all compositions share the same sequence of [rhetorical] parts, almost all of these sections will be found in any good melody.

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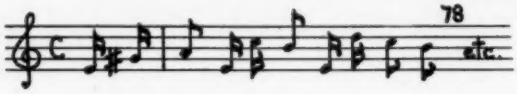
75. "Subject" here must be taken as a rhetorical term. The German word is Sache which can be understood only as the "subject" of a speech or an essay and has no musical connotation.

76. In rhetoric confutatio means that the speaker presents arguments against his own proposition and then proceeds to resolve them.

77. Reprise means a repetition of entire sections; repetition indicated by a sign. (Walther, op. cit., p. 521.)

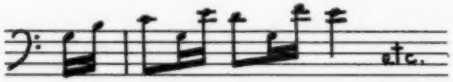
15. The following bass-subject is the exordium of the aria:

The same is taken up without ado by the voice and, since it already reveals the entire purpose of the melody, it is used almost identically in the following manner; however, it is now at a higher pitch:



This is actually the narration, which is continued up to a cadence, with the completion of the meaning of the words.

16. After a modulation to the third[79] the bass begins an answer, the real proposition, as it were, which appears thus as propositio simplex:



Even though the subject is still the same, it has gained new strength from having been transposed. Since it is first stated by the bass alone, it is a simple proposition.

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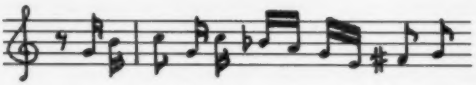
* It seems that the composer has used the transposed Dorian mode. Since, however, we cannot give the entire aria here, the following staves do not bear a key-signature and the major sixth or f-sharp is added only as an accidental. One can see that even the old modes can still be used in the galant style.

78. The vocal part is originally in the c-soprano clef. Mattheson's vocal notation, i.e., as far as the note-flags are concerned, has been retained.

79. Nachdem nun der Absatz in der Tertz erfolgt ist ... Mattheson's omission of the actual part here referred to makes a translation of this passage somewhat difficult. Whether or not there is a modulation in the technical sense is not apparent from his text. The translator has used the word "modulation" to indicate that the music has somehow moved to C. The problem is not acute here, since between minor and its relative major there is no problem of modulation.

17. Next, however, the voice enters with a noticeable alteration and thus creates a propositio variata:



Next, the melody is continued in the same manner for several measures until the meaning of the words demands a halt again.

18. Now the bass takes up the subject once more, in a way that resembles the beginning. Before it has come to the end, however, it is met by the voice-part, which gives the melody an entirely new appearance. In company with the bass it thus forms a compound proposition, propositio composita, as follows:

19. Again, after some measures, the confirmation or reinforcement of what has already been heard in various forms takes place, but with noticeable and beautiful alteration.

This is as far as the first half of the musical speech goes; it is then, usually, closed in the same way in which it began and thus a peroration or conclusion is made.

80. The translator has made some unindicated corrections. The upper voice of the original is short an eighth rest in the first measure. There is no sharp before the g in the upper voice of the original. In the case of the missing sharp the error obviously occurred in printing; the lines on which the notes stood were printed with the notes, and there is a distinct gap in the stave before the g in question.

20. In the second part, after the composer has presented his new narration and has, as it were, made an apostrophe,* he tears off, so to speak, a little piece of his heretofore general subject and makes a special subject out of it. Thus, by means of ties and contrasts (read: dissonant objections), he keeps up the confutation until he resolves it neatly and brings it to a rest on the fourth, according to the Hypodorian mode. I shall quote and annotate the entire passage:

a) here ends the peroration; b) this is a transitus or transition by means of which the preceding is joined to the following; c) at this point begins the apostrophe or aversio; d) is the answer or REPERCUSSIO to the sixth of the tonic [Hauptton];[81] e) here the contrasts and their resolution

* An apostrophe means that the speaker unexpectedly turns to other listeners.

81. Apparently Mattheson is thinking of the momentary arrival in f in measure 4, although it is most likely one of his innumerable mistakes, since at d) the key is definitely g minor, i.e., the seventh of the tonic. In ¶21 (line 2) he correctly says that the new answer is on the fourth; there is, however, a grammatical difference between the two cases. In ¶20 Mattheson uses the dative, thus implying that "the sixth" is indirect object; hence the translation "the answer to the sixth," while the passage in ¶21 is translated as "the answer on the fourth." The use of the dative, implying "going toward" leads the translator to

meet, confutatio, rhetoribus dissolutio, nobis resolutio.

21. After this the bass takes up the complete subject by means of a new answer on the fourth, makes something entirely new out of it [dreht es ganz fremd herum] and is followed by the voice, again with a change.[82] It looks like amplification and argument (amplificationi & argumentatione), by means of which the melody moves toward the fifth.

22. Here follows a fresh answer or repercussio on the fifth of the key. In rhetoric, under the heading of figuris dictionis, this is called refractio seu reverberatio.[83] This, however, is handled in such a way that this time the voice-part does not follow but moves against the bass. Finally, the above-mentioned [excerpted?] clausula enters a new confutatio and thus the second sentence or period closes and the

suppose that Mattheson may have mistakenly taken the f in measure 4 as the key toward which the subject is moving, whereas it actually is the beginning of a new sequence.

82. Literally, the word Verbesserung used here by Mattheson means "improvement."

83. The translator believes that, in view of the context, the rendering of the Latin phrase as "refraction or reflection" will speak for itself without further explanation.

repetition is begun.

This may justifiably be called a good plan. It is not only well laid out, but well worked out. Aside from the six prescribed parts of disposition, there is also a demonstration of certain elements belonging to the category of figurae dictionis et sententiae.[86] We have pointed them out in passing, even though they are part of decoration. Whoever is so in-

84. Another obvious defect of printing. The first a of the tie is missing in the original. There is a distinct gap in the stave and the tie is in its usual place, i.e., under the stave.

85. Apparently again a defect of printing. In the original instead of one sixteenth note followed by two thirty-second notes, there are two sixteenth and one thirty-second notes.

86. Concerning the distinction between the figurae sententiae and the figurae dictionis, H. J. Unger (Die Beziehungen zwischen Musik und Rhetorik im 16. bis 18. Jahrhundert, 1941, p. 7f.) gives the following brief explanation: "Word figures [dictionis] ... [are] those which arise from changing the position, repeating and comparing [in the grammatical sense] words and expressions, while the second group [sententiae] consists of figures [involving] whole sayings (Gottsched). The latter group includes the question (Interrogatio), distribution [see below], and aposiopesis which means a sudden breaking off of the speech." Unger cites an example of distributio from the works of Shakespeare. It will, no doubt, be helpful to repeat this example here: "A knave, a rascal, an eater of broken meats; a base, proud, shallow, beggarly, three-suited, hundred-pound, filthy, worsted-stocking knave; a whoreson, glass-gazing, super-serviceable, finical rogue; one trunk-inheriting slave; one who wouldst be a bawd, in way of good service ..." etc., etc. (King Lear, Act II, Scene II.)

"As a musical term distributio was first used by Scheibe, who understands it to be, exactly as in rhetoric, a breaking down of something into its parts. It has its greatest application in the fugue." Ibid., p. 74.

clined will pursue this study further. He will be astonished to find that these things are contained in all good melodies, just as if they [the rhetorical parts] had been made for the purpose.

24. Such disposition is very important, and the relationship between all the parts of a piece depends on it. Nevertheless, many excellent persons and very inventive composers usually overlook it. If they sometimes succeed, nonetheless it is by accident, since they ignore the basic rules and, regardless of their natural gifts and instincts, have never formulated any rules concerning disposition.

25. The art of the orators consists of the following: they begin with their strongest arguments, present the weaker ones in the middle, and close with stronger ones again. This could well be something of which the musician, too, may make use, particularly in the general disposition of his work. It may seem as if this prescription lent approval to those [composers] who do nothing but give their arias a good da capo in which, while the beginning and end are equally strong, the middle often looks quite pathetic. The reason why this kind of disposition is not good lies in the fact that it ignores the whole while putting all the effort into certain parts. One must understand that a work must not merely have this appearance in general, but be particularly disposed in such a way that each part in itself observes the three degrees of strong, stronger, and strongest argument.[87]

27. In writing large oratorios I usually begin at the end and work this out while the spirit is still fresh enough for me to create something effective. Nevertheless, all the while I consider the rest of the work. Everyone must follow his own inclination. If I mention my way [of composing], I do it neither out of conceit, nor in order to make it a rule, but only to point out that I have always succeeded with this method. The listeners have always been so moved at the end, where it matters most, that they remembered a great deal of it.

40. If we are finally forced to say something about decoration, it will be chiefly to remind the reader that this depends more on the judgment of the singer and player than on the composer. There must, however, be some decoration of melody, and the figures and ornaments of speech will serve well here if they are properly applied.

41. One must under no circumstances use decorations excessively. The figures* which are called [figurae] dictionis have a great

87. Paragraph 26 and fifteen paragraphs beginning with number 28, all of a very general nature, have been omitted.

* Word figures that ornament expression and are pleasing to the ear consist of repetition, in which all the repeated parts sound either almost alike or entirely different. There are twelve of them, and they can be easily applied to single notes. Phrase-figures, in which an entire phrase expresses a certain affect, occur both within and outside of debate. [Unterredung can mean either debate or conversation; the use of this term is not very clear.] There are seventeen of these, almost all of them usable in music. They may be found in any book on rhetoric.

similarity to the alteration [Wandelungen] of notes, alterations of length, or of rising and falling, etc. The figurae sententiae, however, are concerned with entire phrases [Sätze], with their changes, alterations, imitations, answers, etc. The so-called ornaments [Manieren] very often spoil many beautiful melodies, and I cannot forgive the French for the overelaboration and overdecoration of their doubles, much as I like their instrumental style.[88] They go so far that the beauty of their original melody is often lost. In these phrase-figures all word-figures are lost. Since the latter are best in music where notes take the place of words, they should come first, regardless of all alterations and variations of phrases, i.e., of entire passages or musical periods.

42. Printz* tells the following relevant story about the famous Josquin: "When Josquin** was still at Cambrai, a performer added an indecent ornament [Coloratur] in one of his works. He [Josquin] became so annoyed that he said to the performer, 'You ass, why do you add an ornament? If I had wanted that ornament I should have written it. If you wish to improve well-composed music, write your own but leave mine alone!"

43. Nevertheless, we do not hold ornaments in contempt. Well-placed ornaments are to be esteemed, whether a composer who is himself a clever singer or instrumentalist has written them in or whether they be added by the performer. We do disapprove of their abuse, however, and of the singers and players who, lacking in taste and sense, use them excessively, without moderation, and in the wrong places. The same goes for the excessive fancies of some fantastic composers. They take their mad ideas for pearls and gems while they are usually merely cut and painted glass. The use of forced and oft-repeated eccentricities, of ill-sounding intervals, as well as other unseemly liberties, frequently produces real Hottentot music.[89]

45. The limitations of space and of our purpose do not permit further elucidation. Were it not for this, it would be easy to discuss and demonstrate how the twelve word-figures and seventeen phrase-figures might lend themselves to the decoration of melody. What is

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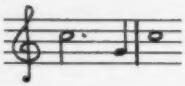
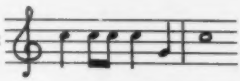
88. The reader should not be misled by the use of the term "ornaments" here and assume that Mattheson is speaking of "word-figures," since ornaments are used only on individual notes. Mattheson is speaking of phrase-figures in relationship to the double, since in doubles the entire dance (Mattheson would say "melody") is changed, usually by ornamenting the melody; they are really variations.

* W.C. Printz, Historische Beschreibung der edlen Sing-und Klingkunst, [Dresden, 1690,] Ch. X, §33.

** It is strange that the greatest composers of France were called there from abroad. Josquin and Lasso were Netherlanders, Lully was Italian, etc., etc.

89. One paragraph omitted.

more usual, for example, than musical epizeuxis or subjunctio,[90] which means the strong repetition of the same note in the same part of the melody:

basically:  with figuration: 

46. What is more commonly used in musical composition than anaphora[91] which means that a passage already used recurs at the beginning of several successive phrases and thus establishes a relatio, a relationship.

Epanalepsis, epistrophe, anadiplosis, paronomasia, polyptoton, antanaclasis, ploce,[93] etc., may be used so naturally in music that it al-

90. "Epizeuxis [subjunctio appears to be a synonym, since it means "to yoke to," "to subjoin"] is a word-figure in which the same word is repeated at the beginning of a sentence, the second time with greater emphasis. Example: 'It cannot be; it cannot be that, etc!" Johann Christoph Gottsched, Handlexicon oder kurtzgefasstes Wörterbuch der schönen Wissenschaften und freyen Künste, Leipzig, 1760, p. 626.

91. "Anaphora, a musico-rhetorical figure meaning about the same as repetitio. It comes about 1) when a periodus or single word is repeated several times in the course of a composition for the sake of emphasis; 2) when the bass is repeated several times, as in chaconnes." Walther, op. cit., p. 34.

"Anaphora, repetition is what both arts [music and rhetoric] understand by this term. Anaphora is the repetition of the beginning word in several successive sentences, or immediately following each other (Gottsched). ... Burmeister knows it as a sort of fugue in which a melodic section is repeated throughout in some, although not all voices. Thuringus restricts anaphora to the bass. Unger, op. cit., pp. 68-69.

92. Mattheson offers no explanation for this symbol which is not the customary sign for trill (t or tr) used elsewhere in this book.

93. Epanalepsis, the return of the beginning of a movement at the end of same. Ibid., p. 76.

Epistrophe. According to Scheibe "... [epistrophe] is the repetition of the closing melody of the first movement at the end of other movements." Cited in ibid., p. 76.

Anadiplosis, the repetition of the last word of a phrase as the first word of the next phrase. Walther, op. cit., p. 34; cf. Unger, op.

most seems as if the Greek orators had taken them from there; they are all repetitiones vocum, repetitions of words used in different ways.

47. Concerning the phrase-figures which deal with entire passages [moduli], who does not know the use of exclamations, already discussed above* in three different applications, as a section of musical speech? Where is parrhesia[94] stronger than in music? The paradoxa, in which surprising things are said, can almost be grasped physically. Epanorthosis[95] or withdrawal is found in almost all opposite motion [Gegenbewegung]. Paraleipsis, aposiopesis, apostrophe,[96] etc., are, in certain respects, all at home in music.

48. Many readers will say to themselves, "We have used these figures and things for so long now without knowing anything about them that we can well continue in this way and ignore rhetoric!" These persons seem even more ridiculous to me than the bourgois gentilhomme

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cit., p. 68.

Paronomasia. "... In rhetoric it means the repetition of a word or phrase with an addition which gives it special emphasis. ... In music the additions may be single notes or pertain to louder or softer volume [stärker oder verminderter Vortrag]." Unger, op. cit., p. 86.

Polyptoton. "According to Vogt the repetition of a section of melody on different pitches ('Cum colon in diversa clavi repetitur!)." Ibid., p. 87.

Antanaclasis, "is one of those word-figures ... consisting only of plays on words but containing no fire of affect. A word having the same syllables with two different meanings." Gottsched, op. cit., p. 99. (The translator was not able to discover the musical application of this device.)

Ploce. This term seems to have the same meaning as antanaclasis. Cf. ibid., p. 1313.

* Pt. II, Ch. IX. [The translator has made this the following section, see page 206.]

94. Parrhesia. "When mi contra fa is used in a composition in such a way that it does not sound bad." Walther, op. cit., p. 463.

"According to Burmeister the occurrence of unusual and daring dissonances resulting from the logical linear consistency of the voices." Unger, op. cit., p. 87.

95. Epanorthosis or correctio. "A phrase-figure in which one speaks as if one were correcting something one apparently had said too hastily." Gottsched, op. cit., p. 615.

96. The translator did not find paraleipsis in any of the sources he consulted. The meaning of the term is given in Liddell and Scott's Greek English Dictionary as "a passing over; 2) a rhetorical figure in which a fact is designedly passed over in such a way that attention may be especially called to it."

Aposiopesis. "In music a general pause, a silence in all the voices." Walther, op. cit., p. 42; cf. Unger, op. cit., p. 70.

Apostrophe. See Mattheson's footnote to ¶20 above. Gottsched (op. cit., p. 118) says, "apostrophe or direct address is a phrase-figure in which one addresses absent or dead persons or inanimate objects. Example: 'Hear me, oh heavens!'"

of Molière, who did not know that he was using a pronoun when he said, "I, thou, or he," or that he was using the imperative when he said to his servant, "Come here."

49. To be truthful, I do not wish to go into more detail here, partly because the reader can gather the truth of my remarks from the above. Besides, while I do not care to be considered a novice, I do not want to carry this business too far all at once.

50. Years ago our learned musicians wrote entire books to teach vocal ornaments. (They called them figurae cantûs; I call them figurae cantionis.) These, however, have nothing to do with the above-mentioned figures and must not be confused with them. Examples of these [figurae] may be found in, among other sources, the work of the former Capellmeister of Nuremberg, Andreas Herbst,[97] as well as in Printz.[98]

51. These things change almost annually and the old ornaments are no longer valid. They may change their appearance or give way entirely to newer fashions. Thus, such instructions must be regarded with pity, and a similar study written today would possibly be equally dated a few years hence. There are some ornaments, however, which have greater permanence, as, for example, the accent, the Schleuffer [sic] and the Vorschlag.[99] Kuhnau has taught [us] something about them, at least as far as keyboard-playing is concerned, in the preface to his suites. This will not be read without profit. While such ornaments belong to the art of performing, the composer must leave op-

97. J.A. Herbst, Musica moderna prattica overo maniera del buon canto, 1641.

98. Op. cit.

99. The translator has left these terms in their original languages, since the terminology of baroque ornamentation is still somewhat problematical. "Accent" and "Vorschlag" are both generally translated as "appoggiatura" and appear to mean the same ornament. "Schleifer" are the ornaments which, according to Kuhnau, are indicated by the following signs: or . The word is usually translated as "slide." There is extensive literature concerning this question and the interested reader can investigate the problem at will. We shall mention here only Mattheson's source, Kuhnau's preface to his Neue Clavier Uebung erster Theil ..., Leipzig, 1689. A facsimile of this preface with extensive commentary may be found in Denkmäler deutscher Tonkunst, Erste Folge, Vol. IV, Leipzig, 1901. (Kuhnau's preface is on pp. 3 and 4 while the commentary may be found in the editor's introduction.) An amusing sidelight that may be of some significance is that Mattheson refers the reader to an actually very incomplete commentary on ornamentation. Kuhnau gives the performer only a bare minimum of information. The performers of the Baroque, of course, had no difficulty with ornaments, since they appear to have been accustomed to supplying their own. Kuhnau supports this custom. In his later publications of keyboard music he has virtually no ornaments and refers the performer to the above-cited preface and to ornaments as they are indicated in the work of 1689. In that work, he says, the performer will find the ornaments he (Kuhnau) likes.

portunities for them.

52. One more thing to remember. The fugue must rightly be included among the figures of amplification, of which there are about thirty. These figures are more suitably useful for expansion, amplification, decoration, ornamentation, and show, than for the thorough persuasion of the spirit. In the fugues, as in a hothouse, we find mimesis, expolitio, distributio,[100] and other blossoms that rarely develop into fruit. More about this elsewhere.

Concerning Musical Punctuation
(Selections from Part II, Chapter IX)

1. The theory of musical incisions,[101] also called distinctiones, interpunctiones, posituras, etc., is the most essential part of composition. In Greek it is called diastolica.* This theory has, however, been so underrated that until now no one has formulated the slightest rule for it; in fact, no information [Unterricht] about it has been available and the name is not found in the latest musical dictionaries.

2. Some years ago a great German poet thought he had made a strange discovery, namely, that music behaved like rhetoric in this respect. How marvellous! The music-masters, especially those who instruct others in the art, ought to be ashamed of their own backwardness. Although one or the other of them has naturally stumbled on some healthy thoughts, the good gentlemen have remained on the edge without penetrating to the core of the problem. Consequently they have neither publicly nor privately been able to put the matter into its proper form.[102]

5. Each statement [Antrag], be it spoken or written consists of sentences or periods. These, in turn, consist of smaller sections that together make up a period. Sentences made in such a way grow into paragraphs and several paragraphs make a chapter. This, in brief, is the stepwise design or climax of all that is spoken, written, sung, or played.

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100. Concerning distributio see footnote 86.

Mimesis. "In rhetoric mimesis means the mocking imitation of something previously said. Vogt explains its musical application as follows: 'Ethonopesis vel mimesis. Cum aliquis alterius vocem imitatur, ut mulieris:' The translator interprets this as"... If some voice imitates another in the manner of a woman (i.e., on a higher pitch)." Unger, op. cit., p. 83.

"Expolitio consists of remaining in the same place and looking at something said now from this, now from that angle (expol. est ... cum in eodem loco manemus, et aliud atque aliud dicere videmur.)" Johann Chr. Ernesti, Lexicon technologiae latinorum rhetoricae ..., Leipzig, 1797, p. 156.

101. The words "Incision," "Einschnitt," or "Abschnitt" will in general be translated simply as "punctuation" hereafter.

* An etymological footnote by Mattheson has been omitted.

102. Two paragraphs omitted.

6. In melody, tone-speech, as it were, we need at most one paragraph at a time. Usually this takes up the duration of an aria. The paragraph[103] is made up, as we said, of several short sentences or periods, of which at least two are needed. There are occasional exceptions to this doctrine, according to the demands of clarity.

7. Those great poets (if they don't mind [my saying so]) who in writing a cantata [-text] take the following lines for a paragraph, i.e., an aria, offend against the essential and natural character of a musical sentence, since these lines actually constitute no more than a single sentence. Because of its length it is called a peribole or periodicum.

> Being, that fills not only time
> But all of eternity;
> Nay, out of whose perfection
> Even the sea of eternity,
> Springs like a little brook;
> Yet all of whose greatness is but goodness:
> My soul adores thee.[104]

8. There are seven lines or sections here which, however, make but one four-member sentence or period. Because of its length and distinction it looks like a rich garment. Yet, without belittling the great inner beauty of the thoughts, it is not at all musical. It is not a paragraph that would inevitably have to be an aria, for the particular reason that in an aria the melody must have a place to rest a little at some point before the end. While it would be suitable for setting as an arioso or [some] other extraordinary accompanied movement, it cannot be an aria.

9. A period or sentence, to describe it in its turn, is a concise statement containing a complete meaning. Whatever group of words does less than fulfill this demand is not a period or sentence. A structure containing more is a paragraph, which could — and by rights, should — consist of several sentences.

10. We have thus determined that a single period cannot make a musical paragraph because it lacks the parts required by an aria. Outside of music, as is well known, such sentences may be differentiated and separated (as incomplete paragraphs) from their context. However, everyone should have a good reason for doing this — especially if he be a teacher. The rule can be even better illustrated by the opposite.

11. Let us select a passage consisting of just as many lines and just as many sections as the above. This one, however, has three periods. Let us imagine the singer sitting on the bank of a river and

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103. Mattheson uses various German synonyms for "paragraph." In English, however, they are all best rendered by the one term.

104. All the translations of poetry in this chapter are of necessity quite literal and no attempt at poetic rendering will be made. The original punctuation will be maintained regardless of its correctness in English.

uttering the following:

> Clear mirror of my sorrows,
> Accept my tears.
> Let the whispering crystals
> Gently, gently fall!
> That to your silver-waves
> May be joined the dew of my tears,
> to become pearls.

12. Although these fluid words cannot be compared with the excellence of the uplifting thoughts of the previous example (we are not dealing with this aspect here), they are, nevertheless, very pleasant and singable. Aside from this, they have the melodic character of a complete paragraph, which is what we want to show here. We have no intention of slighting the praiseworthy efforts of anybody.

13. If many such arias and recitatives follow each other the work becomes a cantata or a scene [Auftritt], which may be considered a musical chapter. Collecting a number of such chapters, as in an oratorio, passion or theatrical work, makes a book.

14. The recognition of a sentence obliges me to make no formal close until it is over.[105] The recognition of a paragraph, however, forbids me to make a complete close anywhere but at the end of the paragraph. In both cases we have formal endings; the first, however, is not complete.

15. When there are several periods I can make several different formal closes or stops by the use of different keys[106] (except for the last one). The paragraph, however, must be the only place to have a complete final close; i.e., when the final period is also the last one. If the last period is repeated, it has the same freedom as its predecessors. There is nothing, by the way, to keep me from making a cadence on the tonic elsewhere than at the end. This is frequently very good at the beginning.[107]

23. One rarely finds inexperienced or untutored composers who jump over a comma in speech, although even the brighter ones may do this — after due consideration — in composing. The former make a pause or stop all too often where [in the text] no comma can be either heard or seen. Examples of this are so frequent that I worry lest the

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105. For the sake of clarity the sentence has been simplified. Mattheson's use of periodus and Satz as synonyms within a sentence such as this is slightly confusing.

106. "... verschiedenen anverwandten Klängen oder Tönen ..." Literally this would mean "differently used sounds or tones"; however, the context makes it clear that Mattheson must be speaking of "tonalities."

107. A long discursive section explaining the grammatical function of various marks of punctuation, including many learned citations, has been omitted.

citation of a single one might be considered an exception. When great Capellmeister, however, proceed thus in print:

> Happy the one, who by his weight of sin (a rest)
> Is not frightened any more:
> Whose naked faults by our (a rest)
> Protector's purple cloak are covered, etc.,

it must serve us as a mirror and thus prevent us from henceforth making such gross schoolboy errors.[108]

27. It is best to select models of such content that only perfect commas will be found in them; commas, moreover, that demand a real grammatical pause. We shall set them first unaccompanied, to nothing but a melody. In this way the fewest rests will be required, since everything can be done by means of certain melodic turns. This is much better than adding little gasps [Seuffzer] at each joint.

28. In the following example five complete joints[109] may be met with. In none of them, however, is a rest to be found. There is, nevertheless, ample opportunity for breathing, and at the end of the sentence there is a formal close in a related key.

Sedato
bis
Ge - trost, mein Hertz, nun kanst du Gnad um-
fas - sen, dein Jesus will die
Sün - der nicht ver - las - sen, und
sollt es auch am Kreut - ze seyn, und
etc.
sollt es auch am Kreut - ze seyn.

108. Three paragraphs containing additional examples (in Italian, incidentally) have been omitted.

109. Mattheson uses the word Gelenck, a "joint," an "articulation" in the physical sense.

110. Be comforted, my heart, now mercy is within your reach, your Jesus will not desert the sinners, even on the cross.

29. This will be followed by another example, one with three sections which, by way of contrast, are marked off by rests. The comma after the word getrost in the previous example is pendulus or incomplete; the comma after the word Schauet in the following example may be considered pendulus as well as perfectus. The latter [term] seems here to be more applicable than the former.

Grave
Schau-et, mein Je-sus ist Rosen zu glei-chen
wel-che den Purpur mit Dor-nen um-hüllen.111
Schau-et mein Je-sus ist Ro-sen zu glei-chen
wel-che den Pur-pur mit Dor-nen um-hüllen.112

30. A certain learned theoreticus prefers the commas in the bass or in the accompanying lowest voice rather than in the main melody. He wishes them to be expressed by means of cadences and makes this obligatory.

31. Although, if necessary and for the sake of variety, commas can be suitably suggested by means of such bass-clausulae which rise and fall in an imperfect manner (per clausulas imperfecte ascendentes et descendentes)[113], this is inadvisable in proportion to the greater degree to which the melody would become meaner and poorer because of the many cadences in the bass; for the melody must follow the bass.

32. There are a thousand more reasons why the bass should proceed in accord with the higher voice, the servant after the master, the maid after the mistress. For that reason I advised in paragraph 27 that one leave the bass out altogether in exercises of this kind, especially since I know that everybody always wishes to give the bass

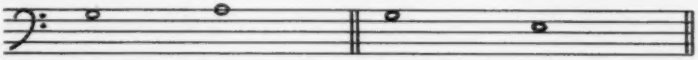
111. The last two syllables of umhüllen require two notes. Mattheson deals with this problem by a correction in his "emendanda"-list in which he gives the elided form umhülln for both measure 9 and the last measure.

112. Behold, my Jesus is like roses, whose purple is surrounded by thorns.

113. See footnote 114.

something to do and thus frequently neglects the more essential part. What, after all, does the bass have to do with melody? It belongs to harmony. One must not confuse these things.

33. This is how the commas of the above theoreticus look in a manuscript:[114]



Clausula imperfecte ascendens

Clausula imperfecte descendens

34. There is, however, small comfort in this, for not every suggested joint in writing, not to mention singing, demands a special stop. It is therefore easy to see that one must bear in mind that not only are there written commas that are not actually pronounced, but also many that can and must be ignored in melody.[115] That is the reason for this distinction, which should be well noted in Critica musica,[116] inter comma perfectum ac pendulum, i.e., between a perfect and an imperfect joint of speech.

35. Since we have already given two examples of the perfect comma, with as well as without rests, it appears to be appropriate now to give a small example of the imperfect comma as well. Let me say in advance that the dubious or hanging comma is sometimes subjected to only a very brief stop; most often, however, it is subjected to no stop at all.

36. The first, that is the short stop, occurs after a sad exclamation (exclamatio) or after such a command (imperativus) as truly demands a pause or thought. For example:

O! that Zion's help would come to Israel.

Or:

Stop! Do not slay him. He is the king, etc.

37. With inserted vocativi as well as with the imperativi, i.e., where there is any exclamation or a command expressing the heat of violent emotion, as for example in the twice exclaimed adverbia,* ach,

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114. The first is probably a so-called deceptive cadence (I to VI), the second, a cadence ending on the first inversion of the tonic triad (V to I_6).

115. A free translation for the sake of clarity.

116. J. Mattheson. A periodical collected in two volumes, 1722-25.

* It may easily be seen — and should be excused — that I make an effort to explain grammatical as well as other terms by means of equivalent German ones. Unfortunately I have to consider those among my readers who, while they are musically learned, would have difficulty

ach, nein, nein, ja, ja, etc., all punctuation is skipped because of the urgency of the expression. This is even truer in singing than in speech. We need not give a musical example, the words themselves suffice.

Extinguish, Cupid, your flattering light! (punctum)
Phlegeton, give me glittering sulphur! (punctum)
Lend me, O stars, the face of Medusa, (comma perf.)
That I may punish the shameful offense! (punctum)
Let me, O heavens, bask in the joy, (comma perf.)
Of revenge!

38. Besides the four periods or sentences and the two perfect joints, we have here seven suspended commas, namely the four inserted vocativi, "Cupid," "O stars," "O heavens," and "Phlegeton," all of whom are called upon. Besides these there are three emotional words of command or imperativi: "extinguish," "give me," and "let me." None of these seven, however are regarded as [separable] sections of melody. We may judge similar things according to this example.

39. While the comma represents that part of speech called a joint or articulus in the human body, the colon represents a membrum, an entire member, as the Greek name implies. The semicolon (;) is only half a member. Let us discuss the latter first. The semicolon represents a section half-way between colon and comma. Such sections are used for disjunctivi, oppositi, and relativi, i.e., in such places as represent a separation, an opposite, or something referring to something else, especially when such circumstances are contained within a few words.

40. The semicolon has another characteristic peculiar to itself: it is often used before the grammatical meaning has been completed. The colon, on the other hand, is never used in such a case; it requires complete grammatical sense while the rhetorical meaning, however, is still unresolved.

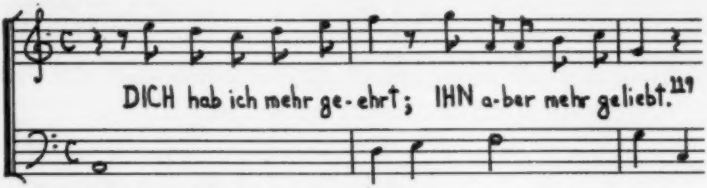
41. Disjunctiva express separation and disparity but not opposition. Thus they may be expressed in melody by such tonal relationships as are somewhat removed from one another. Example: "You I honored more; him I loved more." Or: "I must surrender my body to you; do not demand my heart as well." In the first sentence love and honor are separated from one another; however, they are not opposites. Heart and body are separated, as it were, in the second sentence; they are not, however, hostile to each other.

42. In such cases the melody must make a noticeable distinction; one member of the musical rhetoric must be parted or separated from the other in some way. However, one must not introduce something [musical] that is opposed, whether by means of tonality or interval.[117]

in saying what exclamatio, vocativi, adverbia, etc. mean. It annoys me to have reason to add this note.

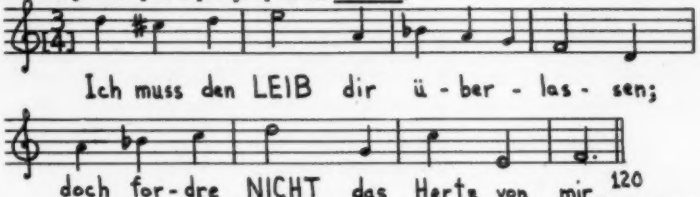
117. A concluding part of the sentence has been omitted, since its significance, which does not appear to be important, is somewhat obscure.

This means that I must not make the intervals contradictory, [i.e.,] use a major third where a minor one had been, etc. Nor may I place rising passages where there had previously been descending ones, and vice versa. But I may in good fashion change the key and go to another closely related one. For example from A[minor] to C[major] in a recitative.[118]



[119]

From D[minor] to F[major] in an arietta.



[120]

43. The most important element in such cases depends on stress or emphasis. In the first example the main stresses are on the pronouns "you" and "him"; another, if lesser, stress falls on the verbs "honored" and "loved." In the second example the greatest stress is demanded by the word "not" and a weaker one by the noun "heart." A formal close, as in the above examples, is not always necessary

44. When there is actual opposition, the situation is quite different. Opposition of the words demands similar opposition in the music. Such conflicting delivery is best suited to recitatives and arias. It must not be forced, however. An example in melismatic style:

> One promises with mouth and hand,
> One will not say a word;
> But, as soon as a back is turned,
> The promise is already broken.[121]

---

118. This paragraph becomes clearer when the musical example in paragraph 45 is examined. In that example Mattheson, in order to express opposites, divides the setting into two parts corresponding to the two parts of the sentence. The first part ascends, the second descends. The translator assumes that the comment about changing major to minor thirds refers to a case in which the music is repeated. In that case, since the parts of the sentence are not "opposites" any change should not be too radical.

119. You I honored more; him I loved more.

120. I must surrender my body to you; do not demand my heart as well.

121. The translation of this poem serves also as the translation of the text in the following musical example.

These are clearly opposites: to keep one's word or to break it. These conflicting acts may be expressed by such opposite motion of tones and intervals as will make an image for the ear.

45. I say that one may do this — not that this is a requisite so indispensable that without it the melody ceases to be a melody. Clarity is clarity, however. Also, such remarks [as the above] are helpful to invention, for opposites can be melodically expressed in several ways: by means of passages that reverse their path, by intervals that run counter to each other, by sudden changes of key and meter, etc. To avoid becoming too lengthy, we shall give an example of the first kind of contrast [only].

Da sagt man zu mit Mund und Hand, kein Wort soll sein ge-
spro-chen; doch wenn der Rüc-ken nur gewandt, ist
schon das Wort ge-brochen.

46. Relativi (to which, among others, all brief successive descriptive phrases belong), have their own characteristics. Rather than contrasting and warring things, there should be equality and similarity of notes and intervals. One should not, however, overdo this similarity, for there must, of necessity, be difference and variety. Example:

> Countless is the army of the stars;
> Countless the sand at the sea;
> Yet they are less than the number of my sorrows.[122]

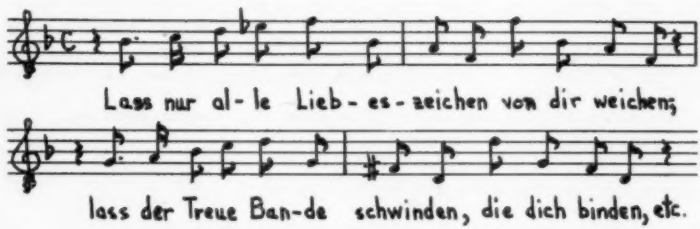
There you have in the first two lines a pair of sentences, of comparisons, that are related to one another. They should be expressed by means of similar passages [Modulos]. The third line, on the other hand contains a contrast and therefore demands contrasting treatment of tonality [Klängen und Ton-Arten], as follows:

122. The text of the following musical example.

47. If semicolon sections that are related (relativa) to each other also happen to have similar rhyme and structure, or if this happens in one sentence or another, for example:

> Let all signs of love
> desert you;
> Let loose the bonds of faithfulness
> that tie you.[123]

elegant and easy transpositions [Versetzungen] and good repetitions become possible in view of the relativa.



48. The so-called small descriptive passages will seldom be found in arias, since they would make for too great length. They are often found in recitatives, however, and if they are treated intelligently, they can be quite effective. We shall give here the expression of someone in despair. The example contains many small or half-members:

123. The text of the following musical example.

My pains cannot be expressed; my troubles are countless;
The air sighs for having nourished me;
The earth for having borne me;
Is worth only burning;
The stars become comets,
To slay me, monster of nature;
The earth refuses my body its grave,
Heaven refuses my soul a dwelling:
What shall I do,
Desperate, damned murderer?
Rather than suffer so,
I shall hang myself![124]

49. This selected and in its way very beautiful description might be set to music as follows: (see pages 217 and 218).

50. Space does not permit an examination of the similarities between all of the above four or five half-members. If you examine the entire paragraph, you will find that a certain falling of the melody [Fall der Stimme] always points up the semicolon. The bass, too, contributes its share in marking the sections, especially in marking a new sentence — not by contrast, however, but by similarity. The five joints or commas are treated quite differently: the lowest voice does not even approach a complete clausula. On the other hand, at the colon or complete joint a formal close combined with rests aids further thought, and what follows is in a different key. The question is contrasted, and at the exclamation point there is a final cadence.

51. Sometimes one finds an antithesis, a contrast, between the first and second parts of an aria. In that case the semicolon at the end of the first part becomes of necessity a period, since, when it is repeated from the beginning, it must be the final close and thus demands a complete cadence in the tonic key [Final-Note]. Let the following words serve as example:

Shall I love another?
My ambition says "yes";
But I shudder to see,
How it would grieve her,
Who favored me. (da capo)

52. Aside from this single case, which I should rather avoid by means of working the da capo out twice,[127] the semicolon must never have a formal, certainly not a complete cadence. One must not pay too much attention to the poets, who often can show little reason for their punctuation. It is a somewhat controversial subject. Some prefer not to use the semicolon at all and restrict themselves to commas

124. The text of the following musical example.

127. "... mittels einer zweifachen Ausarbeitung des da Capo." There appears to be no doubt that Mattheson means a written out (and, therefore, changed) da capo.

Un-säg-lich ist mein Schmertz; un-zehl-bar meine
Pla-gen; Die Lufft be-seufftzt, dass sie mich hat er-
nehrt; die Welt die-weil sie mich ge-tra-gen,
125
ist bloss da-rum Ver-bren-nens werth; Die Sternen werden zu Co-

125. In the original the sixteenth rest is followed by an eighth note thus giving the measure a sixteenth too many. It seems obvious to the translator that the mistake is not corrected by eliminating the rest (which falls on a semicolon) but by shortening the note following the rest.

me-ten, mich Scheu-sal der Na-tur zu töd-ten;
Dem Cörper spricht die Erd ein Grab, der Himmel meiner
Seel den Wohn-plate ab:
Was fang ich dan, ver-
zweif-fel-ter, ver-damm-ter Mörder an? eh ich mich soll so
un-er-träg-lich kränc-ken, will ich mich hencken!

126. The original has a semicolon here. That this is an error may be deduced from the text as printed in §48 and the explanation in §50.

and periods.[128]

54. We now come to the colon (:) proper. This has somewhat more importance than the previously discussed sections, since it encloses a greater part of speech and has complete grammatical meaning. However it remains clear that something must follow to complete the rhetorical meaning. For the latter reason the colon may not have a complete final cadence, but rather one that calls for further motion, a resting place that demands resumption, a clausula desiderans.[129]

57. We have room here to consider only the most urgent problems of melodic writing. It should be noted that a stop should be made before causes;[130] but that there should be no cadence. When a story is to follow, the melody must be left doubtful, as it were. This is usually done by means of a fifth degree of the scale [in the bass] with 7-6 figuration, sometimes by other means. Lipsius is right when he says, "colon suspendit"; the colon does want to suspend.

58. "Examples" may be treated in the same manner. A deduction is different and does not need a resting point that demands resumption. Similes can stand a preceding cadence; headings, however, [have a preceding cadence] under no circumstances. The latter must be explained by means of a monotone, i.e., by the use of the same successive note almost as in the tied [gebundenen] church style.[131] Finally when the words of another or thoughtful saying are to be quoted,[132] the melody must not only be interrupted but must change key as well.

59. Since the manifold use of every punctuation mark is quite clear, the intelligent reader can see for himself whether it makes sense to adopt one rule for all colons and semicolons (particularly as the colon itself is used in six or seven different ways), as a famous and learned royal Capellmeister would have it. He takes care of them all without further distinction by means of the following bass-figure.[133]

61. We shall now examine the interrogation in musical speech.

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128. Paragraph omitted.

129. Two paragraphs, mostly concerned with the grammatical aspects of the colon, have been omitted. The last sentence of paragraph 54 has been somewhat freely translated.

130. Colons are used before causes.

131. In Pt. I, Ch. X Mattheson describes the gebundene Kirchen-Styl by which he simply means either Gregorian chant or Gregorian notation involving ligatures, i.e., "notes tied together." It is plain from this that "the monotone, the use of the same successive note" is the Gregorian recitation tone or tenor.

132. In German direct quotation is preceded by a colon.

133. Paragraph omitted.

It is indicated by the sign (?). There are either real or implied [verblümt] questions. Many composers rigidly maintain that the question mark must always be expressed by a rising of the voice. One must not, however, take for granted that this device is always right.

62. In common speech and pronunciation the voice always does rise more or less when there is a question. In melody, however, there are many conditions that not only tolerate an exception but actually demand one. In poetry, moreover, there are many figurative questions that actually do not leave any doubt. Doubt is the true mark of a real question. A composer must, therefore, make a clear distinction and arrange his notes accordingly. If, for example, this is the question:

> Can I administer medicine,
> When I myself must die?

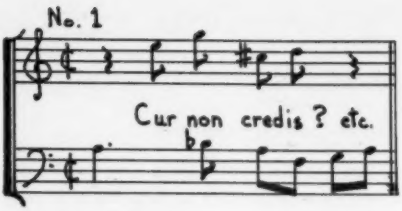
the meaning is that nobody can help another who needs to be helped himself. This is basically a statement that is beyond all doubt. When, therefore, questions are phrased this way, one must not adhere too closely to the usual form. A clever composer is, nevertheless, free to make his melodic resolution by emphatic displacement, in the manner of a question.

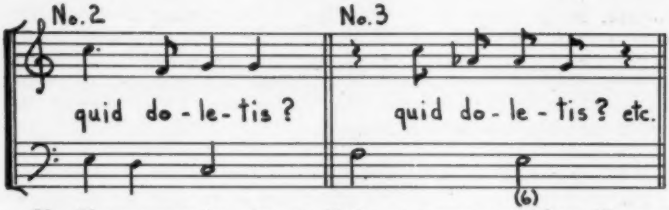
63. It has been shown in paragraphs 49 and 50 above how a real and definite question can be expressed without a rise of the voice. This method leaves the question wide open, nonetheless. To it [the method shown there] should be added that imperfect consonances are most suited to the purpose [of expressing a question]. To end the question on a sixth, whether rising or falling, is good, particularly in recitatives.

64. Gasparini[134] set the question, "Why do you not believe?" in an aria as shown in example 1 below. He did it with a descending figure ending on a sixth. In another place he used the everyday formula (example 2) and ended on a fifth. This too is good and we shall not criticize it. However, it should be handled as in example 3 by means of a sixth[135] which is not so common.

134. Francesco Gasparini, 1668-1727.

135. The translator assumes that "sixth" refers to the use of the inverted C-major triad at the end, since Mattheson has apparently rewritten example 2 as example 3.





65. If one were to suppose that, as among questions there are two kinds, so among exclamations there are three, closer examination would prove him right. Thus the composer is obliged to make a distinction, although there is only one kind of sign (!). The first kind [of exclamation] includes astonishment, joyous exclamation, or an encouraging command. For example:

1. Monarch!
   Mighty one! You are the unconquerable hero!

2. Hurrah! Hurrah! Long live, long flourish
   Hammonia!

3. Roar, thundering guns!
   Crash with fiery lightning!

Joy is the master and the reigning passion here. For this reason vivid and fast passages as well as large intervals must be used.

66. The second kind of exclamation embraces all wishing and heartfelt yearning; all pleading, invocation, and complaint, as well as fear, horror, terror, etc. The last-named demand melodic violence, which is best expressed by fast and nimble sounds. Yearning and the other emotions are always children of sadness. For example:

> Heaven! If you still have mercy for my
> suffering, then, o! now is the time to help me.

According to the particular circumstances, one must use now large but not commonplace intervals, now intervals that are small and extraordinary. Tenderness is the predominant affect.

67. The third kind of exclamation comes close to real cries, as when extraordinary consternation and astonishment arise from grue-

some incidents, cries reaching the highest peak of despair. Let us suppose Cain represented thus:

> Open up, jaws of smoking hell!
> Pull me down into your heat!
> To you I deliver my despairing soul! etc.

68. Of course, I would gladly add my humble voice to demands for banishing such gruesome, horrible representations from music. If, however, they do occur, one must know how to deal with them. This depends, in the main, on a knowledge of the various affects. Here we have unmitigated despair, and thus we may bring together conflicting intervals whose characters are at war with one another, such as major and minor thirds. We can set such wicked blasphemous exclamations to a mad turmoil of fiddle scraping and blowing. The pyrrhic foot[136] is well suited to this sort of thing.

69. Let me, parenthetically, as it were, insert a few words about the parenthesis here. This kind of section is an inserted phrase which, separated by these marks ( ), to some extent interrupts the flow of continuous rhetorical thought. It is not a very musical thing and, as far as I am concerned, could well be excused from service in musical science. Since, however, it does occasionally occur in an aria and, more frequently and suitably, in recitatives, the composer who wishes to deal successfully with such enclosed phrases must more or less interrupt the main purpose of the melody in accordance with the greater or smaller interruption of the main purpose of the words.

70. As an example of those insertions that depart quite far from the path of direct meaning, let the following be observed. We have not set either of the examples to music.

> How easy it is for him who deals thus with worms
> That he use even our dust (for, as is known,
> Nothing becomes nothing) to further his glory.

Should this be sung, the melody would have to descend from the middle range of the soprano to the middle range of the alto, or, at least, a fourth or fifth, as if it were now for another voice.[137]

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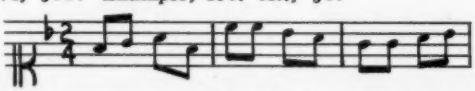
136. "The pyrrhichius consists of two [short] sounds of equal duration. It is named, some say, after the Epirotic king Pyrrhus who is said to have been a lover or inventor of it and to have introduced certain war-like dances in this rhythm. ... It might be that such heated fighter-leaps are named after their speed rather than after a person, since both words have the same origin, namely, meaning fire and heat." Pt. II, Ch. VI, §11. Example, loc. cit., §6:



137. Two paragraphs containing other examples omitted.

73. If these insertions are fairly closely related to the context or if they contain brief exclamations, one must follow natural speech. Rests and stopping places are not suitable, since they do far more disservice to the verse-structure than they aid the understanding.

74. I believe that those who freely and honestly wish to be truthful, including the greatest poets of our time, will have to admit that for the most part these insertions and parentheses are rather forced. Often they are included only for the sake of a rhyme. No one who has the least bit of musical insight, however, will deny that insertions are of little or no benefit to melody and should be used sparingly.

75. To give a Davidian example of how a parenthesis is best dealt with in music, we recommend taking Psalm 124 and setting the words, "If the Lord were not with us," for the whole chorus, while the words "(say, Israel)" are sung by a solo voice followed by the tutti again singing, "if the Lord, etc." In that way this and similar insertions will be very effective.

76. Since the period (.) closes everything, we shall close this chapter with its examination. Although it is the most important punctuation mark of musical speech, it is the least problematic. One needs to do nothing but make a formal cadence in the place where the period is found, a complete clausula and, finally, a complete close in the tonic key.

Concerning Emphasis in Melody
(Selections from Part II, Chapter VIII)

1. Emphasis* deals with stress of thought, sounds or words; it explains them and makes them clear. Its use demands profound thought. The following four observations lie within the scope of "emphasis."

2. First we must consider emphasis proper, i.e., the sound and stress of the words themselves. This was already touched upon in the above chapter on melody,[138] but we must now elaborate it further and apply it to music.

3. Aside from this, the long or short pronunciation of syllables must be considered here. This is called "accent."

4. Third, we must examine passaggi and graceful melodic runs.[139]

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* Mattheson's footnote has been omitted.

138. Pt. II, Ch. V. ¶95ff.

139. "Passaggio (Ital.), passage (Fr.), consists of several running figures joined together. This does not include tirate and circoli or those circoli, tiratae [sic] bombilantes, and other simple running figures .. which follow each other without a break. (See Printz's Compendium signatoriae et modulatoriae vocalis, p. 53, and Brossard.) According to the latter they are a melodic row [Reihe-Gesang] consisting of many small notes such as eighths, sixteenths, etc., strung to-

5. Fourth, we must observe not only the repetition of words but of melodies, progressions, and voice-leading, in so far as certain stresses are required in these factors and the preceding ones. All this belongs under the heading "emphasis."

6. Before we examine each of these things in detail, we must briefly show how emphasis is distinguished from accent.

7. Accent, which here means the special sounds of a syllable, had a different meaning, as we have seen above, in melodic decoration [Modulatorie], where it refers to an ornament, or manière. In the art of poetry it is called accentus metricus, Reim-Fall; in music it is called accentus melicus, Singe-Fall.

8. The distinction, accordingly, lies in the following characteristics: first of all, emphasis always falls on an entire word, not according to its sound but according to its meaning. Accent, on the other hand, has to do only with syllables, with their length, brevity, and rising and falling pronunciation.

9. Besides this, every word of more than one syllable has at least one accent; not every word, however, receives emphasis. And vice versa, words of one syllable often lack any real accent, while they may be easily emphasized.

10. Third, accent is concerned only with pronunciation. Emphasis virtually points to the affect and illuminates the sense and meaning of the delivery. That is where the difference lies.

11. As an illustration of the above four properties of emphasis — in sound and song — we shall first present a very short melody. The

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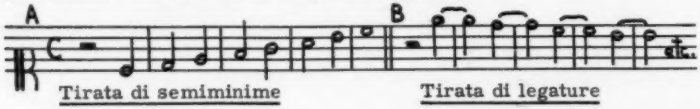
gether for at least one or two measures and no more than three (p. 89). ... A passage should be no longer than a phrase singable in one breath, like a morceau, a bite." Walther, op. cit., p. 465.

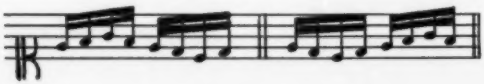
Tirata is defined by the same author as a series of many notes of equal value. Illustration in Table XX, figure 9:



Tirata di semiminime Tirata di legature

"... especially when they consist of eighth and sixteenth notes preceded almost always by a rest and followed ordinarily, by longer notes." (Ibid., p. 609.)

"Circolo, a circle, ... 2) when two circoli mezzi are written in such a way that if they were placed above one another they would make a complete circle." (Ibid., p. 166.) Example, ibid., Table VIII, figure 9:



Il ciel tu fè SI bel - la, leg
gia - dra pas-to - rel-la, per - chè tu sia PIE-
TO - SA, NON cru - do al tuo pas - tor.
Il ciel tu fè SI bel - la, SI
bel - la, leg - gia - - dra pas - - to -
rel - la, per - chè tu sia PIE - TO - SA, NON
cru - da, NON cru - do al tuo pas - tor.

main rule that can be given is that such emphasis almost always involves a noticeable rise of the vocal part, if not necessarily a great one. (Even a half-step may often suffice.) The stressed note need not be the accented one.

12. Let us take the following words as an example:

Il ciel ti fè SI bella,
Leggiadra pastorella,
Perchè tu sia PIETOSA; NON cruda
al tuo pastor. *

13. We find three points of emphasis here, on the words si, pietosa, and non. ** Musically they might be expressed in the following manner: (see page 225).

14. The felicity of a well-placed accent can be no better illustrated than by a comparison with a poorly placed one. From such observation of opposites much advantage is to be gained both in learning and in teaching. [140]

16. The word-accent must always be placed on an accented note of the melody [melodischen Klang]. It does not matter whether in this case, the note is especially raised, as for emphasis, as long as it is not lowered too much in repetition [Wiederspiel]. [141]

17. The general rule to be observed when dealing with accent is this: the note that falls on the accent [of the text] must be appropriately long or newly struck [anschlagend]. [142] It should be observed that emphasis does not depend on this exclusively. It may occur on short or passing notes [durchgehende Noten] if it is provided with some other distinguishing factor.

18. To clarify the above it is necessary to say that neither an accent alone nor the written time value [äusserliche Geltung] can make a note long or anschlagend in the present meaning. The inner content

* Transl.: Heaven made you so beautiful, pretty shepherdess, that you should show pity to your shepherd, not cruelty.

** Si is an incendens which raises beauty higher; pietosa the word on which the whole piece depends and cruda would contradict this, were it not for non. These are the reasons why stress falls on these particular words, where some persons would least expect it.

140. A paragraph discussing accentuation in speech has been omitted.

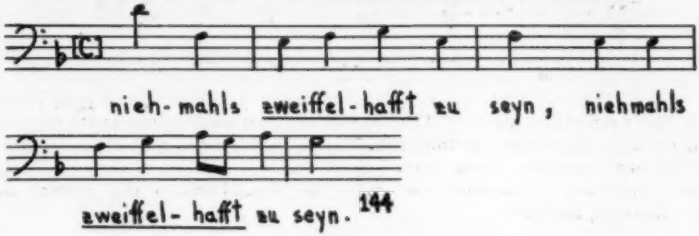
141. The translator cannot clarify this somewhat obscure passage except for the assumption that Mattheson is referring to a repetition of the text with a different musical accompaniment.

142. "Anschlagen is the opposite of remaining on the same note and of passing notes. It means, especially in keyboard playing, to strike the previous note again, or to strike a new one." [Literally translated it would read "to strike the previous fingering again..."] Walther, op. cit. p. 38.

and melodic [singende] accent alone can do this.

19. Of what this content and melodic accent consists has been sufficiently explained in Critica musica on pages 40, 41, 42, and 43.[143] We ask the reader to refer to it so that we need not become too lengthy here. The whole problem may be likened to a coin whose inner and outer values are often quite different.

20. Let us give some examples of poorly placed accents and ask ourselves on which syllables of the word zweiffelhafft [doubtful] the accent lies and whether the following figure places it correctly.



[144]

21. Both times the syllable hafft stands out, doubly so since it not only ascends but also has intrinsic value.[145] This can be justified only for the first syllable.[146] Without doubt, the passage ought to read as follows:

143. "An accent is the inner content and emphasis of a note which takes place in such a way that at certain times a note stands out from the others even though its appearance does not differ from theirs!" Crit. mus., Vol. I, p. 43.

"Accentus and anschlagende notes are synonyms!" Ibid., p. 44.

144. "Never to doubt!" All the translations of the texts of musical examples in this chapter will be quite literal in order not to obscure Mattheson's arguments.

145. "Intrinsic value" is the literal translation. The term presumably refers to the fact that the syllable falls on an accented part of the measure.

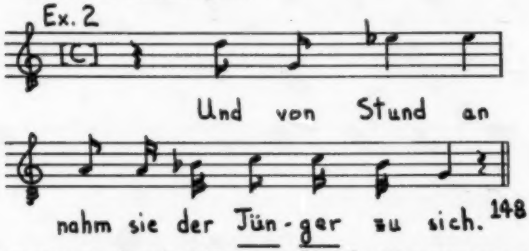
146. The word zweifelhaft (the modern spelling) is accented on the first syllable. As far as meaning goes, too, emphasizing the last syllable would be analogous to an emphasis on the last syllable of the English word "doubtful."

22. Thus we have seen a small example taken from a real aria. This terrible state of affairs, however, is found more often in recitatives and we shall therefore give some examples in order, so to speak, to contrast black and white.

[147]

23. Anyone can see that the numbers vier [four] and eins [one] are the important words. The accent as well as the emphasis [of the text] lies on them and not the word Theil [part]. Since this time neither rising nor intrinsic value were made use of, and the notes were both times short and of no particular value, we should change the passage in the following manner:

24. Here is a similar pair:

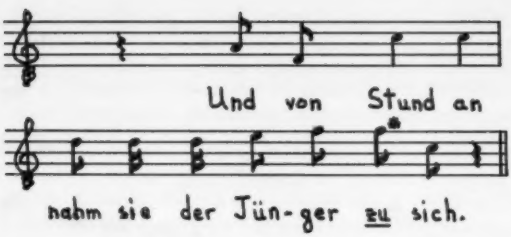


[148]

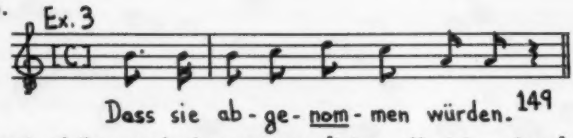
The spoken accent clearly falls on zu [unto]. The composer, however, has treated the word briefly and as if it were unimportant. It would be better and more emphatic as follows.

147. They divided [them] into four parts; one part for each soldier.

148. And from that hour the disciple took her unto himself.

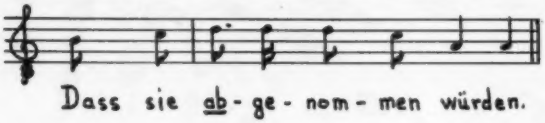


25. Ex. 3

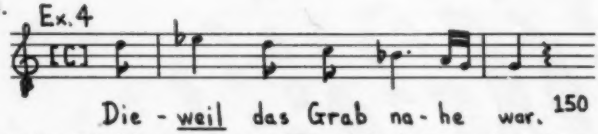


149

The accent of the word abgenommen [taken off, taken down] is undoubtedly on the first syllable, not the middle one as in the above example:

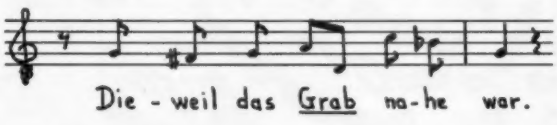


26. Ex. 4



150

Neither on the syllable weil nor on the article das may there be an accent but only on Grab [grave] and possibly on nahe [near].



* I am not unaware of the fact that the ordinary manner of writing this would make both of the last two notes c; however, this time I have written them as they are sung. [If the last two written notes were both c, baroque performance practice would have made the first one an appoggiatura (port de voix, accent, or Vorschlag), i.e., it would have been sung as an f. Examples of this practice may be found in Leopold Mozart's Versuch einer gründlichen Violinschule, 1756, Ch. IX; C.P.E. Bach's Versuch über die wahre Art das Klavier zu spielen, 1759, Ch. II; and, particularly, in Pt. II, Ch. III, §§24-26 of Mattheson's Capellmeister. The latter mentions that this particular ornament is "used daily in recitatives."]

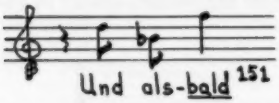
149. That they would be taken off [or down].

150. While [because?] the grave was near.

27. In example one, both emphasis and accent are on the same words, vier and eins. Treating them otherwise, therefore, creates a double error. In example two, the compound verb zusichnehmen [to take unto oneself] is separated in the third person. In such words, whether they have three or four syllables, the accent falls on the one that comes first in the infinitive regardless of where the syllable is placed when the word is separated.

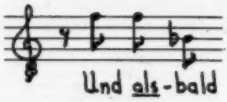
28. The same holds true for the word abgenommen in example three. In number four, there can be no accent on the last syllable of dieweil; this is even truer for the article das. When das becomes a demonstrative pronoun it is often accented, not, however, when it is used as an article. The accent is on Grab or possibly nahe.

29. In words of two syllables it should be noted that when the syllables are of equal length, the first, not the second should have the accent. This would be incorrect, therefore:



151

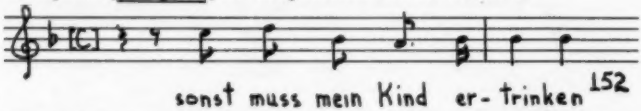
This is correct:



The reason for this is that the first of two syllables must always have preference as prima inter pares.

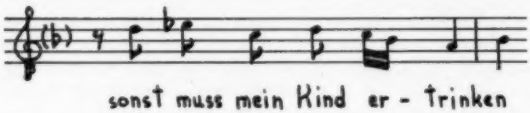
30. While most German words of two syllables usually have their accent on the first, the second being short or being made short, there is one exception in musical composition. Almost all the final notes of a melody must be anschlagend or have the accent, although the final syllable on which the note falls may be short.

31. I say "almost all," i.e., almost every last note of a melody, since I mean all real and formal cadences. Frequently an exception is made if one wishes to stop abruptly. In former days nobody observed this fine point [Artigkeit] of composition and ended thus:



152

nowadays, however,



151. Alsbald is accented on the second syllable in modern German pronunciation. The word means "forthwith."

152. Else my child must drown.

32. These things depend on circumstances. Wherever the text has an accent there must unfailingly be a melodic accent as well. When the syllables have no accent, however, it is, nevertheless, possible to have a melodic accent. This is one of the musical prerogatives.

33. We come now to passaggi. Right here let us take the words of Pilate from the Passion: "Weisst Du nicht, dass ich Macht habe? etc."[153] Would it make an emphatic or pointed melody to place a melisma of twenty-eight sixteenths on the word habe [have]? I doubt that anyone would think so, not even the composer. The latter would be like David who did not believe that Nathan's story of the sheep concerned him.

34. A melisma on habe, however, would be preferable to one on the word Kind [child] in the first stanza of an ode, in which [type] nobody binds our hands, as here:

[154]

35. How large a field we should find before us were we to examine and index such things! It is to be hoped that intelligent composers will proceed more thoughtfully and will not write music that takes its toll by suppressing emphasis.[155] If for one reason or another they want or must use such decorative passages with unfruitful words, let them at least not select such clumsy ones.[156]

44. Just as clever and moderate repetition adds much force to the melody, analysis or fragmentation [Auflösung] does too. The first

153. The Gospel according to St. John (here literally translated from the German): Know you not that I have the power, etc.

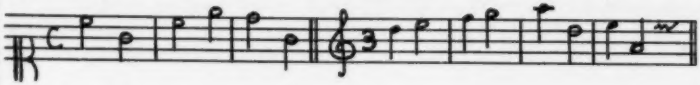
154. Else thy child must drown. (In the previous examples with this text it was "my child!")

155. ... statt des Nachdrucks die Music nicht zur Unterdrückung bringen. Somewhat obscure and therefore freely translated. We add the literal translation here, "... instead of emphasis makes the music a [means] of suppressing." A possibility that in this context does not appear a likely one would mean exactly the opposite, "... instead of emphasis suppress the music."

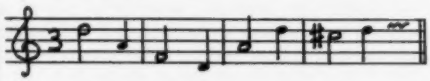
156. Five paragraphs dealing with repetition are summarized here rather than being given in full. Repetition of words should be used only for the sake of emphasis. Mattheson dislikes repeating "innocent words" and thus "submitting them to torture." Words of importance, however "may well be repeated three or four times in order to lend them stronger emphasis."

Spondaic foot

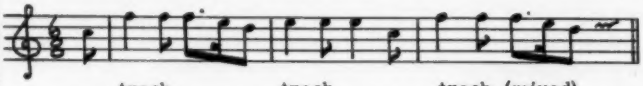
Iambic foot



Trochaic foot

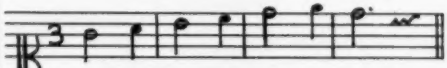


For valley-peasants



troch. troch. troch. (mixed)

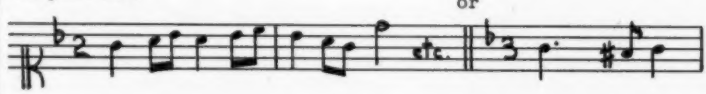
Lullaby

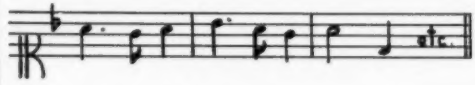


completely trochaic

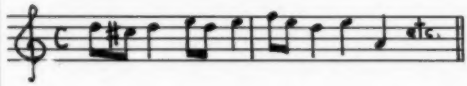
Dactyllic foot

or

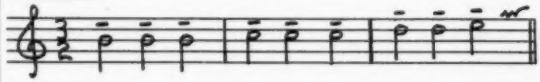




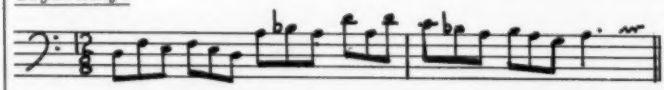
Anapaestic foot



Molossus



Trybrachys



mention of this may be found in Critica musica, vol. III, pp. 18 & 24.

45. Take for example the following words:

Let flow into my heart
O God, despite all pain of sin,
But one drop of Christ's blood.

The words may be declaimed and broken up in five different ways after they have occurred once in their proper order: 1) Let flow, o God etc.; 2) But one drop into this heart; 3) Let flow Christ's blood into my heart; 4) Despite all pain of sin into my heart; 5) O God, but one drop.

46. This figure is most effective where the meaning of the words is somewhat far-fetched or dislocated [verworffen] or if, as in the above example, there are three or four phrases that must be heard in their entirety before the whole can be grasped. In such cases analysis not only furthers understanding and is almost necessary, but lends extraordinary beauty and unexpectedly moving emphasis.[157]

Since Mattheson, in his chapter on the various rhythms (Pt. II, Ch. VI, Concerning the Length and Brevity of Sound or the Organization of Sound-Feet), offers few comments on their affects, the translator feels that it would serve no useful purpose to incorporate the entire chapter in the translation. The following, therefore, represents the literal translation of only those sentences that are relevant to the subject of the affects. The musical examples illustrating the rhythms discussed here will be found on page 232.

The spondaic foot is suitable for the expression of piety and respect. At the same time it is simple.

The iambic foot is moderately gay. It is neither of a flighty nor of a running quality.

The trochaic foot is not expressive of sharp [spitzig] or brittle [spröde] qualities ... In Sweden the peasants in the valleys like to dance to it. It is best suited to Spanish canarie-gigues and to lullabies. It has a quality that is somewhat satirical, but intrinsically it is rather innocent; certainly, it is neither serious nor sharp.

The dactyllic foot is very common. It is suitable to jocose as well as serious melodies.

The anapestic foot is more effective than the dactyllic one in jocose and strange [fremden] melodies. It is also used in serious pieces, customarily, however, it is there mixed with other rhythms.

157. The omitted last two paragraphs of this chapter give similar examples of fragmentation of shorter phrases.

The molossus has a quality of heaviness and laboriousness. Its majestic steps are also suitable to a march or to pageants [Aufzüge], especially when kettledrums [Pauken] are used. The molossus is less suited to lively pieces or dances; it is good for serious, sad, and melancholy compositions.

The trybrachys is used mostly in gigues. Sometimes, however, it is used in serious pieces, i.e., in those running figures that are called "triplets."[158]

* * * * * * * * * * *

In his earlier book, Das neu-eröffnete Orchestre, Mattheson devotes an entire chapter (Part III, Chapter II) to the affects expressed by the various keys. Since he omits this aspect of the doctrine of the affects in Der vollkommene Capellmeister, a summary of his previous discussion is appended here. It should be pointed out that, dogmatic as he appears to be, Mattheson is aware of the fact that there is not and never will be any unanimity of opinion on this subject and advises his readers that he does not wish to usurp their right to form theories of their own. He is giving his own opinions "only in order to help the reader to get a clearer view of the subject."

Before going into the discussion of the keys, he summarizes earlier opinions on the modes very briefly. He is apparently unaware, however, that the Greek modes differed from the later church modes. In describing the affects of the keys, he cites other writers such as Athanasius Kircher,[159] Glareanus, and Johann Michael Corvinus.[160] The following summary will be restricted to the opinions of Mattheson without consideration of what other writers may have had to say on the subject.

Two general opinions about the nature of the keys are rejected by Mattheson, one in its entirety, the other as "oversimplified." To believe that major keys are gay and minor keys sad is not entirely wrong, says Mattheson; it is just not as simple as that. But it is stupid to believe that keys that have a signature with flats are "soft and tender," while the keys with sharps are "hard, fresh, and gay." He further warns the reader that he is going to base the descriptions that are about to follow on Cammer-Ton, not Chor-Ton.[161] The order in which Mattheson lists the keys has been retained in our summary.

D minor, the tono primo (Dorian) is believed by Mattheson to be somewhat devout and calm, at the same time grand, agreeable, and expressive of contentment. He therefore recommends it for the further-

158. For an explanation of the pyrrhichius see footnote 136.

159. Author of Musurgia universalis (1650).

160. Author of Heptachordum danicum (1646).

161. For the most recent discussion of Cammer-Ton and Chor-Ton see Arthur Mendel, "On the Pitches in Use in Bach's Time," The Musical Quarterly, XLI, pp. 332 and 466.

ing of devotion in the church and for achieving peace of mind in communi vita. He does not wish to imply, however, that this key cannot also delight; nevertheless, "skipping music" must not be written in it, whereas "flowing" music will be very successful.

G minor (transposed Dorian) is "almost the most beautiful key." Mattheson finds in it not only the rather serious character of D minor combined with spirited loveliness, but also uncommon grace and complaisance [Gefälligkeit]. "It is suitable for tender as well as refreshing things, for yearning as well as happy ones. In short, it lends itself well and flexibly to moderate plaintiveness and tempered gaiety."

A minor (Aeolian) is found by Mattheson to be somewhat plaintive, dignified [ehrbar] and relaxed. "It is sleep-inducing but not disagreeably so. It is highly suitable for keyboard and other instrumental compositions."

E minor (Phrygian), says Mattheson, can hardly be considered gay. "Whatever one may do with it, it will remain pensive, profound, sad, and expressive of grief; in such a way, however, that some chance of consolation remains."

To C major (Ionian) Mattheson ascribes a rather rude and impertinent character, but says that it is suited to the expression of joy. "A clever composer who chooses the accompanying instruments well can even use it for tender and charming compositions."

F major (transposed Ionian) "is capable of expressing the most beautiful sentiments, whether these be generosity, steadfastness, love, or whatever else may be high on the list of virtues. It is natural and unforced when used to express such affects." He compares it to a handsome person who looks good whatever he may do and who has, "as the French say, bonne grace."

D major is found to be somewhat sharp and stubborn, very suitable to noisy, gay, war-like, and cheering [auffmunternden] things. "No one will deny, however, that if a flute is used instead of a clarinet[162] and a violin is the predominant instrument instead of the kettledrum, it can very well be used for delicate things."

G major (Hypoionian) Mattheson calls insinuating and persuasive. It is, besides, somewhat brilliant and suited to the expression of serious as well as gay affects.

C minor "possesses both exceeding loveliness and, at the same time, sadness. Since the first quality is too prevalent and one easily gets tired of too much sweetness, it will be best to enliven this key by a somewhat spirited and regular mouvement. This will keep its mild-

162. There is some question here whether Mattheson is indeed speaking of the clarinet, since generally trumpets were used with kettledrums in martial music. The term clarino meaning "high trumpet" is, of course, well known.

ness from becoming soporific. If, of course, it is intended to induce sleep, this consideration does not apply."

F minor was felt by Mattheson to be mild and relaxed, yet at the same time profound and heavy with despair and fatal anxiety. It is very moving, says Mattheson, in its beautiful expression of black, helpless melancholy which occasionally causes the listener to shudder.

B-flat major (transposed Lydian) "is very diverting and showy, however, somewhat modest. It thus can pass as both magnificent and delicate [mignon]." Mattheson agrees with Kircher, who says that it elevates the soul to more arduous things (ad ardua animam elevans).

Mattheson considers E-flat major to express the opposite of lasciviousness, it being rather pathetic, always serious, and plaintive.

A major "is very touching, although it is somewhat brilliant. It is best suited to the expression of plaintive and sad passions rather than to divertissements. It is especially good for compositions for the violin."

E major is found to express desperate or fatal sadness. "Under certain circumstances it can be piercing, sorrowful, and penetrating." He compares it to the "fatal separation of body and soul."

B minor is, according to Mattheson, seldom used because it is bizarre, moody, and melancholy.

F-sharp minor, "although it leads to great sadness, is somewhat languid and amorous rather than lethal. It is also somewhat abandoned, singular,[163] and misanthropic.

In conclusion, the translator wishes to express his gratitude to Professor Gustave Reese of New York University for his patient and helpful interest as advisor on the original thesis from which this article has been extracted.

163. The original words "abandoniert" and "singulier" taken over from the French cannot be translated with any certainty. Abandoniert might mean either "deserted" or "wild," singulier might mean "alone" as well as "extraordinary."

THEORY FORUM

RE: THE ALIFERIS MUSIC ACHIEVEMENT TESTS

By James Aliferis

Since I missed reading the first issue of the Journal of Music Theory and since I had been told there was a review of the Aliferis Test in the second issue, I was most anxious not only to see the review of our work but also to become acquainted with this new periodical in music theory, a field which has sorely needed a scholarly publication. I cannot begin to describe my feeling of shock when I read the review of the Aliferis Test by Mr. Kraehenbuehl. It seemed unbelievable that under the respected name of the Yale School of Music, wherein it is stated that the Journal of Music Theory is a "scholarly periodical," there should be published, not an objective critique but a series of comments which, at times, amount to diatribes.

Considering the nature and quality of Mr. Kraehenbuehl's remarks, it would serve no constructive purpose to try to set straight each of Mr. Kraehenbuehl's comments. However, Mr. Kraehenbuehl's comments fall into three general areas which I would like to answer accordingly.

1. Scientific Procedure. "As disturbing as the unscientific basis for the tests is, the pseudo-scientific report of proceedings is misleading and still more disturbing."

As everyone knows, one of the first rules of scientific procedure is to make a report of the proceedings giving a step by step account of whatever action was taken. No one is obliged to accept what has been reported, but least of all, would anyone expect a fellow-scientist to say that reporting of procedure was, in itself, "psuedo-scientific, misleading, or disturbing."

The article which Mr. Kraehenbuehl reviewed on the Aliferis Test appeared in the Journal of Applied Psychology which is published by the American Psychological Association. The Journal of Applied Psychology is one of the oldest and most respected journals in psychology devoted to the application of psychology in education and industrial settings. If our findings were of the quality that Mr. Kraehenbuehl described, it would be safe to say that this highly professional journal would never have published the Aliferis Test article.

Furthermore, this article was the first to appear outside the music world and promptly received the following comment from one of the directors of test development of no less an organization than Educational Testing Service of Princeton: "I have just finished reading your article...in the Journal of Applied Psychology. It represents an outstanding example of careful, rational analysis as a basis of test development. . ."

2. Musical Content. "Many of these choices involved bizarre notations... Examples of illiterate notation, unfortunately, abounded in the test itself, even in some of the examples included in the journal report. Although there is not space here to spell them out, an example would be the use of a dotted half-rest to indicate a full bar of silence in 3/4 time."

I don't believe any comment is needed here except that if the test author is musically illiterate, then Mr. Kraehenbuehl includes as musically illiterate the several hundred music theory teachers across the country who administered and reviewed the test through several experimental test editions during 13 years of test development.

3. Test Validity. "Under these conditions, the test results would have no validity whatsoever despite any of the numerous reliability and validity tests applied by the test designers and duly reported in the monograph."

It seems needlessly redundant to have to state that a test's validity (how successfully a test measures what it purports to measure) is shown when non-test data corroborate the test findings.

To validate the 1950 administration of the Aliferis College Entrance Test we waited until the students graduated from college in 1954 and then purchased the official transcripts of the music majors in five midwestern state universities. (These schools were chosen because statistical studies had shown that midwestern state universities have the largest and most homogeneous population of music students in the country.) Correlation of all the music grades that these students had earned with the Aliferis Test scores at college entrance was a high .66. Surely, if according to Mr. Kraehenbuehl the test had "no validity whatsoever," then what the test measured would have had no, or only very little correlation, with the grades that music teachers gave through four years of college music study to the largest population of music students in the country.

The Aliferis Tests have been developed with the sincere desire that they be, first of all, good music tests, which also incorporate good psychological controls. Our aim has been to produce music tests which can be given by musicians — whom Mr. Kraehenbuehl describes as a "local theory teacher." In addition to these musical qualifications, the tests have built-in a most careful set of test controls. Thus the tests are so well balanced as to musical content and psychological controls that, contrary to Mr. Kraehenbuehl's rash conclusions, they have shown excellent validity and have already earned wide recognition and acceptance by both musicians and psychologists.

* * * * * * * * * * *

Since Mr. Aliferis has organized his comments on my critique of the Aliferis Music Achievement Tests (which appeared in the "Theory Forum" of the November, 1957 issue of the Journal of Music Theory) around three points, I will respond in order.

1. Scientific procedure. Mr. Aliferis and I are in complete agreement with regard to the proper manner of scientific reporting. Every step should be reported. This being so, the question which was raised in my original commentary still stands: "Why are we never told exactly how the tests were administered?" The unstandardized method of administering the tests, described in my original critique, was the basis for my query regarding the validity of the tests. The original report omitted the answer to this question and Mr. Aliferis' present reply makes no further comment on this omission. That the editors of the psychology journal as well as an official of the Educational Testing Service apparently assumed a standardized administration of the test when this was not actually the case seems to substantiate my observation that the report is misleading. Only the small group of theory teachers who administered the test would know for certain that no standardized procedure existed.

2. Musical content. Mr. Aliferis quotes correctly my use of the word "illiterate," and I need hardly point out that the sentence makes no reference to general musical illiteracy as Mr. Aliferis suggests. Many literate musicians are not especially competent in the details of musical notation. This is the business of the highly-trained editors employed by music publishers. If the Aliferis Tests have the national significance claimed by the authors, they should warrant extremely careful preparation in collaboration with an expert in musical notation. The fact remains that the notation of the tests included many illiteracies. This would prove neither the authors nor the administrators to be musically illiterate nor did my critique suggest this possibility.

3. Test validity. It would require too intricate an argument to deal with Mr. Aliferis' third point which I did not raise in my critique. No correlation procedures are meaningful when applied to improperly assembled data. My objection was to the method of assembling data, not to the operations which were subsequently performed upon the data. If reasonable correlations developed under such conditions, we must conclude that the sample basis was small, as Mr. Aliferis admits, or that happy coincidence created an apparent correlation where none really existed.

I would like to add that the published critique was not hastily conceived. It was carefully rewritten after consideration by a number of associates. It is the purpose of a scholarly periodical to provide a detailed examination of every idea or method that comes within its purview. Such careful scrutiny is likely to produce an occasional negative report. My own report, produced in collaboration with several other scholars, was certainly negative but not a diatribe. Nor was there any intent, as Mr. Aliferis' carefully placed quotes suggest, to belittle the "local theory teacher." The use of this expression in the critique was adjectival, not epithetical. At the time that I administered the Aliferis Tests, I was myself a local theory teacher. I am still a local theory teacher although my locale has changed. And finally, my original critique included a number of specific questions that were obviously not carelessly formulated. Unfortunately, Mr. Aliferis' response does not include an answer to any one of these questions. Answers to these

questions would have been both interesting and helpful. They would have given further significance to the tests themselves. Are we to assume that there are no answers?

David Kraehenbuehl

* * * * * * * * * *

RE: ANALYSIS AND ELEMENTARY HARMONY

By William D. Gettel

The article "Unity in Music" in the Journal of Music Theory, Vol. II, No. 1, pps. 97-104 was apparently a well-intentioned sketch of an ambitious approach to a difficult subject — elementary harmony. New insights into the problems of teaching this subject and new attempts to solve them are always welcome, particularly if directed toward closer correlation between theory and reality. There should be many eager readers of proposals claiming to show how elementary skills with chords can be acquired with less tedium and more value by combining their study with general analysis. Many teachers already will have found ways to deal with this; but they are likely to suspect, if modest, that there is always room for improvement. Unfortunately, this article is not very helpful and itself needs improving. Some may find it irritating. Professional competence and respect for the professional competence of the reader are to be expected even in informal comments offered "only as suggestions" (p. 98).

A number of statements are certainly malapropos, possibly even condescending. This is a minor criticism; but surely no reader of this journal needs to be told that "each ... composition of the common-practice style [uses] primarily similar ... details" (p. 98); or that "the harmonic context of a Chopin Prelude is quite different from that of a Bach Prelude" (p. 101); or that "meter ... sets up a ... pattern of successive accented and unaccented beats, representing the establishment of the strong and weak areas of the measure" (p. 102); or that "form is not to be considered the application of an external plan or building scheme but rather the logical outgrowth of the music itself" (p. 103). If lack of tact were the only flaw, one might be merely amused. It is more difficult to be tolerant of serious errors in substance.

In the generalization "satisfactory melodic movement in almost all cases reduces to a basic stepwise line" (p. 100) the evaluation is unwarranted and the proportions exaggerated. It should read: "melodic movement in many cases reduces to a stepwise line." Bach shaped many quite "satisfactory" passages around completely or predominantly disjunct skeletal lines — the beginnings of the two-part Invention in F, and Preludes VII and XXI in WTC I, to cite only a few.

But even an amended statement would be pointless without some indication of what is to be gained from analysis by reduction. The article promises to provide this (p. 98), but does not do so. Only Ex. 6

compares the melodic reduction with the original, and it is more confusing than enlightening. The passage cited in Ex. 4 could have been used to demonstrate the utility of reduction in making significant distinctions and correlations between "foreground" and "background."

Example A: Meas. 1-2 of Prelude XXIII in Bach's WTC I.

If derived for this purpose, the skeletal remains are not equal in value, as Ex. 4 (with one exception) seems to imply. Disposing of the immediate foreground of sixteenth-note motion by reduction yields a stepwise line of quarter- and half-notes, which is clearly audible even without reduction. But the clear tonic chords in meas. 1, the tonic accent of the melody, and its resolution in meas. 2 pick out b, d#, f#, and d# as the cardinal points of the line. This triadic scheme is given mobility by dissonant, non-tonic, passing harmonies in meas. 1 and by both metric and durational emphasis on the dominant seventh chord. This broadening permits a neatly off-balance one-beat delay in reaching the top of the line. Similar lines are found, with overlapping inversions, at the end of the Prelude. The tenor, for example, stresses descending thirds — e, c#, a#, f#, (e), and d#. But here, preparing for the final cadence, the central harmony is dominant, with weaker tonics and tonic substitutes. In the last measure the delay of the a# by suspension parallels the delay of the f# in meas. 2, again in a precadential dominant stressed both durationally and metrically.

In the preceding analysis the correlation between rhythm and harmony seems fairly clear; in others it may be somewhat "elusive" (p. 102). However, the high purpose proposed for an analytical approach to the study of harmony is compromised at once if it be assumed that rhythm "deserves less definition" for the student of harmony than for the student of composition. Rather one could assume it requires more. The composer's impulsiveness, intuition, and inventiveness need be expressed only in music. The analyst's inquisitiveness, insight, and interpretation must be rationalized.

In considering rhythm as a unifying factor (p. 102f.) the article points out first that "unique rhythmic features ... which differ appreciably from the established norm of rhythmic movement" are "liable [meaning likely] to sound out of place or isolated from the ... context unless such unique movement is made to occur with sufficient frequency" [thus ceasing to be unique] to justify "its own existence as a unifying factor of elaboration." This is merely a roundabout way of stating that a characteristic rhythm can become motivic, and that if it actually is unique it may sound out of context — which is not necessarily the same thing as "out of place." Again, the a priori evaluation is unwarranted.

The chorale melody Ich bin ja, Herr, in deiner Macht was put forward in support (Ex. 7). Being probably by Bach himself, it is more highly unified than some earlier chorale tunes. The second phrase is almost an exact sequence of the first. The third phrase is composed mainly of motives from the first two, and its skeletal line resembles theirs. The contrasting fourth phrase uses a modified form of an earlier motive (the broken triad), and it has one motive peculiar to itself (the four eighth-notes); but the line ends at its high point instead of falling to the cadence as in the first three phrases. The expectancy thus generated is fulfilled in the last phrase, which inverts the line of the fourth and comes out on the only tonic full cadence. In addition, the last phrase is related motivically to the first two, and rhythmically (in its first measure) to the third.

What connection this melody has with the points it apparently was supposed to illustrate is not clear. Actually it does contain one "unique" rhythmic configuration, the cadential measure before the double bar; but this doesn't sound at all out of place. And to say that so highly integrated an organism is an example of "melodic unification through sixteenth-note elaboration" is like saying that two people resemble one another because they have unusually blue eyes when as a matter of fact they are twins.

Perhaps a better example of consistent but not always motivic elaboration would be something more rhapsodic — the 2nd movement of Bach's Italian Concerto, or Les agréments for the Sarabande in his English Suite No. 3. An obvious example of something out of context is the famous chord in the theme of the second movement of Haydn's Symphony No. 94, which surprises the listener less by its occurrence than by its uniqueness. A less hackneyed example would be the "Interruption Motive," as it might be called, shortly before the one-measure G. P. near the end of the Love Scene in Berlioz' Romeo and Juliet.

The article also tries to find some correlation between harmony and metric placement. "The unity between meter and harmony that is desirable" can be established, it claims, "by causing strong harmonic progressions to be associated with the stronger portions of the measure, using ... weak progressions ... with the weaker portions." It is very difficult to assay this dictum on its own terms because those terms are not defined. There is no explanation of "strong" and "weak" as they are applied here to harmonic progressions. Nor can it be supposed

that definitions of such vague terms (evaluations?) are matters of common, hard-and-fast knowledge. Some texts do not use them. Others do, but apply them differently, not without some haggling over their meaning, e.g., Schönberg. But even if it were possible to find a consensus it would be pointless in this context. Whether one progression is "weaker" or "stronger" than another has nothing to do with how either of them may be used metrically. Composers certainly have not felt constrained to use certain chords (or even certain kinds of chords) only in weak parts of the measure, or to reserve certain others only for accents.

The most direct way to discover that "unity between meter and harmony" prevails in both parts of Ex. 8 is simply to perform them. One is as clearly 4/4 as the other. Nor does the harmony prevent performance even in another meter, as shown in Ex. B, p. 245. The cadence, but not necessarily this harmony, would be awkward in other meters. The real relationship between chord progressions and meter can be examined under the heading of "harmonic rhythm," that aspect of the total rhythm which is marked by changes from one chord to another and measured by the durations of chords. Chord changes occur on metric accents much more consistently than anywhere else. From the extreme variety of progressions involved, one would conclude that in this connection any distinction in relative "strength" is specious. Rhythmically, it is the change that is effective, not the identities of the chords. In the Bach chorale referred to previously each of the 20 metric accents is marked by a chord change. In terms of Roman numerals and inversions sixteen essentially different progressions are involved. Other examples of such regularly metric harmonic rhythm can be found almost at random. Preludes VII, XXI, and XXIII come readily to hand, having been cited before.

Not all metric accents are marked by a change of chord. A chord may begin at a bar line (with or without upbeat) and continue through more than one measure, e.g., the first 5 measures of Bach's two part Invention in F, the first 8 measures of the third movement in Haydn's Symphony No. 94, and the second theme (in E^b minor) in the first movement of Beethoven's Sonata No. 8. Melodic movement in the bass or in the upper voices during the duration of a chord logically does not make a harmonic progression and so does not affect harmonic rhythm. It does of course permit metric and other accents. Rhythms involving repeated tones can perform the same function, also without affecting harmonic rhythm. None of these intra-chordal rhythms is as incisive as phrasing. Rhythmically, the second part of a chord divided by phrasing can be regarded as a "new" chord, the first in the next phase of the harmonic rhythm, e.g., meas. 2 & 6-7 in the Bach chorale already mentioned and meas. 4-5 in the Haydn excerpt just cited.

Some metric accents are not marked by a chord change due to syncopated harmonic rhythm. Whether with or without intra-chordal rhythm, a chord may begin in any kind of meter on a weak part of the measure (including, possibly, the secondary accent of quadruple meters) and continue through the next accent; or, in triple meters, the chord may occupy the weak two-thirds of the measure. There is no necessary

lack of unity between the meter and the harmonic rhythm in such cases. Literally syncopated chords occur in meas. 31 & 32 of the first movement in Beethoven's Symphony No. 9, and elsewhere in that work, including the famous opening chord of the Finale. The original article itself provides, on a smaller scale, examples of the more common kind of syncopated harmonic rhythm, in which intra-chordal rhythm permits the metric accent to be made explicit, e.g., meas. 4-5 of Example 6, which is by Bach, and the first part of Ex. 8, which is not.

The melody of the latter, however, is harmonized three times in actual chorales. O Herre Gott, dein göttlich Wort has all quarter-note harmonic rhythm. Being very like the second part of Ex. 8, it is not shown here. Herr Gott, dich loben alle wir has syncopated harmonic rhythm at the beginning of the phrase; Nun lob', mein' Seel', den Herren uses it in mid-phrase. (See Ex. C). There are three versions of each of the latter two titles in triple meter. One has syncopated harmonic rhythm at the beginning, another in mid-phrase.

This kind of harmonic rhythm for the first upbeat is a commonplace in the Bach chorales, and is used also for upbeats in many interior phrases. In Bach's own Dir, dir, Jehova there are prosodic reasons for it. His version of Du, o schönes Weltgebäude in C minor uses it for expressive reasons. In many other chorales he used it apparently as a matter of choice. It occurs in 11 measures of the invention already cited. In Fugue V of WTC I the very short parts of the syncopated chords sound merely anticipatory, as in meas. 10-11. In Fugue VII the metrically strong portions of the syncopated chords are short and so feel suspended, as in meas. 3-4. See also the Trio of the 3rd movement in Beethoven's Sonata No. 7, measures 5-6 of Chopin's Prelude No. 4, several places in Schumann's song Nachtlied (Op. 96, No. 1) and in the first movement of his Symphony No. 1.

The article was needlessly derogatory, then, in labeling the first part of Ex. 8 a "poor" example of the "establishment of unity between meter and harmony"; although possibly it is somewhat exceptional. Single phrases in the Bach chorales seldom contain two similar instances of syncopated harmonic rhythm; and moving from first inversion to root position is the least common means of articulating the chord to prevent it from being literally syncopated. However, the bass line is "poor" — it uses the low g too many times.

Estimates will vary as to how soon syncopated harmonic rhythm should be introduced in elementary studies, particularly for examples associated with complexities and subtleties of form, rhythm, expression, and motivic usage. But if analysis is part of the study, then the students themselves will begin to use it unbidden and early for phrase-beginnings and in triple meter, imitating the Bach chorales and obvious stylistic traits of such dances as minuet, polonaise, and sarabande.

In its coda the article states that "the elements which constantly seek unification in a piece of music cannot be set down in any complete list" (p. 103). Perhaps not, but one would suppose that even a rudimentary list would include motivic organization and counterpoint. Since

Example B: cf. Ex. 8.

Example C:

the statement continues by pointing out that "each piece is a law unto itself," it becomes even more difficult to understand why elements so responsible for character were omitted. Furthermore, these are unifying forces which lend themselves to generalization, and so to illuminating comparisons between pieces and styles.

Even a chorale as simple as the one in Ex. 6 could have been used to demonstrate the utility of these two avenues of analytical exploration and their effect upon harmony. Instead, this example illustrates merely another vague distinction between "strong" and "weak" harmony (this time applied to single chords, e.g., root position vs. inversion), and relies upon principles for determining structure by reduction for which previous examples are hardly sufficient preparation.

The article describes reduction as a process of removing "surface ornamentation and non-essential movement" (p. 100). The former is not exactly a conspicuous feature of the chorales, so in this respect their reduction is no problem. The same leanness, however, often makes it difficult to determine what movement, if any, is non-essential. Since the lower voices frequently are shaping forces as significant as the chorale melody, and since its rhythm often is matched almost note-for-note by the harmonic rhythm, the difficulties cannot always be resolved on harmonic grounds. Under these circumstances, in order to avoid tedious haggling over which subtlety of interpretation is most convincing, it sometimes is convenient simply to apply an arbitrary structural formula evenly throughout the piece, matching the phrase-structure exactly and moving more broadly but in as regularly metric a manner as the melody generally does. For chorales in quadruple meter it frequently is effective to assume that a structure in half-notes will permit as deep a probing into the essentials of the harmonization as necessary. A case in point is the setting by Bach of Du Friedefurst used in Ex. 6. It has the added advantage of being so consistently diatonic that it can be examined with profit by elementary harmony students.

Outlining this soprano in half-note proportions (See Ex. D) yields a closely-knit, coherent line which audibly summarizes the formal and tonal traits of the actual melody. Even in purely skeletal form the second phrase modifies and intensifies the ending of the first. The third phrase is contrasting to a degree but is clearly related to the others; and the fourth telescopes the first two, as indicated by the layout of the example.

The bass confirms these relationships and provides deft, organic, contrapuntal support throughout. In structural contour it is clearly responsive to the basic line of the soprano. It is in contrary motion in phrase 1, although the harmony prevents it from being an exact reflection. Elsewhere it moves in parallel 13ths and parallel 10ths, of course with necessary adjustments at cadences. With the addition of a few well-placed foreign tones, the chords used to connect the structural elements permit a high degree of motivic coherence within the bass line itself as well as tangible relationships with the chorale melody and to some extent even with the inner voices, as in-

dicated by the numbered brackets.

Example D.

With such tight unity in so many respects, no part of either bass or soprano really can be considered "non-essential." The skeletal and connecting chords are functionally inter-dependent, and each combination makes its particular contribution to the particular character of this particular piece. The "reduction" is an abstraction, a more-or-less arbitrary construct, intended mainly to provide a convenient means of outlining the general character and exposing the specific details which give the piece both its unity and its uniqueness.

The weight of evidence as to motivic and contrapuntal rapport between this soprano and bass decreases the likelihood that choices between root position and inversion could have been made on "structural" grounds, except possibly for the former in cadence formulae. For example, there does not seem to be anything inherently structural about the root position tonic chord in meas. 3, as set forth in Ex. 6, particularly since a tonic six-four was used in the comparable place in meas. 8, which was omitted from that example.[1] In his other harmonization of this chorale Bach used the six-four in meas. 3 and found still another setting, among several obvious possibilities, for meas. 8. None of these differences is surprising in view of Bach's well-known compulsion to find different, but equally organic, harmonizations for

1. It should be noted that the structural analysis of phrases 1 and 2 in the original article agrees, more-or-less, with the interpretation published in Salzer's Structural Hearing (I:115 & II:49). Schenker's school, however, also tends to account for the significance of inversion and root position on contrapuntal rather than on vertical grounds.

the same or similar melodic segments, whether in the same or in different chorales. It is surprising that any particular one of his versions could have been singled out, for almost purely vertical reasons, as more "logical" or more productive of "proper unity" (p. 101) than another.

Emphasis upon the horizontal is not intended to suggest that the vertical can be ignored, least of all by beginners; but even this aspect of harmony is not without contrapuntal significance. Generalizations about the intervals created, or exploited, are a necessary concomitant of linear principles in any system of counterpoint. In an amphonic style the soprano-bass intervals of course are particularly important, even though their sound may be modified by the inner voices. Criteria along these lines [!] generally are more precise than descriptions of desirable linear characteristics.

In the chorale style 3rds, 6ths, and perfect 5ths are the predominant soprano-bass intervals, particularly at points of metric stress in mid-phrase. Doublings of these two voices in mid-phrase generally are ameliorated by rhythmic de-emphasis, predominantly conjunct voice-leading, dissonance in an inner voice, or all three. Dissonant intervals are likely to be in a minority but may be prominent in chromatic progressions and in moments of expressive importance. This chorale is not markedly chromatic or dissonant, but in other respects it is typical. Most of the soprano-bass intervals are 3rds, perfect 5ths, or 6ths, one of which occurs on each metric accent except the last. This is the doubling of soprano and bass on the tonic which is necessary to make a full cadence. The other two octaves are in diminished triads on unaccented beats, one with completely conjunct voice-leading, the other with half. The few dissonant intervals are on unaccented beats or weak fractions of beats. Either the advisability of maintaining a particular kind of sonority or a necessary change in expression may influence chord choice, although this one factor is not likely to be conclusive in any one specific instance.

In summary, all analysis of this chorale tends to show that motivic organization and both the horizontal and the vertical aspects of counterpoint dominate harmony, particularly choices between root position and inversion. Which is used at a particular point depends to some extent upon which tone of the chord is preempted by the melody, to some extent upon which bass tone is most apt motivically, and to some extent upon how the line of the bass is shaped to that of the soprano. It is trivial, specious, or both to maintain that musically effective choices can be made upon the basis of nebulous assumptions about the intrinsic "strength" of various chords and their presumed relationship to "structure." Again, these are static, hypothetical strictures not likely to be binding upon any composer, least of all Bach. His works show rather that a higher value should be placed upon sonorous and horizontal elements, or, to put it the other way around, that submission to demands made by sound quality and by the motivic and contrapuntal flow of the piece at hand is more likely to produce "proper unity" with aesthetically sound results than factitious vertical criteria.

This typical analysis has been developed in some detail in order to show what definite advantages this approach can have for students of elementary harmony. It can be profitable even if their knowledge extends only to the identification of intervals and the distinction of root position and inversion. It can help develop a feeling for good harmony and counterpoint well before they can identify all chords or trace the lines of force in complex structures. However, they are not likely to be able to derive all their own precepts from such analysis, for sheer lack of time if not for lack of knowledge and maturity. General guidance and concrete advice still will be necessary; but it is obvious, I believe, that the students will profit much more from being guided toward, advised about, and led to imitate these functional and audible aspects of harmonization and composition than from being spoon-fed deceptively facile, conclusive generalizations based upon isolated factors which in reality are not even particularly efficient in producing the results claimed for them. In conclusion, the main thesis of the original article — that general analysis be made a part of elementary courses in musicianship — represents a laudable ambition. On the face of it one might suppose the principle needs no defense. Perhaps not, but there are attendant risks which evidently do need to be pointed out.

Elementary courses already are crammed with theory, keyboard practice, ear-training, sight-singing, and the traditional kind of "spot" analysis the article refers to as "dull" (p. 97). Even if the latter be left out, the addition of more searching analysis is not a short cut. Not less but more written work becomes necessary, both in analytical and in creative categories. The general tone of lecture and discussion— both of which will be considerably lengthened, incidentally— may seem to anticipate that of traditional courses in "form and analysis" usually reserved for later in the curriculum; but premature, if not immature, contemplation of so much richness and flexibility of material can lead all too easily to superficiality toward the mechanics of craftsmanship which no apprentice should take for granted. Intended to enhance the students' musical experience, such an approach may merely clutter and confuse it.

Intended to hasten the maturity of the students, an analytical approach imposes severe demands upon the maturity of the instructor. He needs an unerring aim not only for those things ultimately most significant in the passages analyzed but also for those things which can be realistically and immediately useful as guides for students struggling with the "reverse process of ... synthesis" (p. 98). He needs an ability to devise exercises for this process which permit early, fruitful, and encouraging comparison with real music. Above all he must avoid superficial, shoddy, or specious generalizations and dogmatically black-and-white evaluations which will be flatly contradicted, revealed as trivial, or riddled with exceptions as soon as his students begin to analyze the works from which such "rules" presumably were abstracted. In short, he must become himself a highly competent and mature, if not brilliantly original, analyst and synthesist. He cannot afford to be merely an anthologist of sterile formulae and a poseur of problems culled from a miscellany of handbooks on harmony and analysis.

RE: QUESTIONS OF MUSIC THEORY AT THE SEVENTH CONGRESS OF THE INTERNATIONAL MUSICOLOGICAL SOCIETY

By Erwin R. Jacobi

The professional work undertaken by the congress, held at Cologne June 23-28, 1958, was arranged as follows: three general subject areas, each of which consisted of two principal papers which were treated further in a number of prepared discussion papers; three public lectures without discussion; ten panel discussions on special topics; and six general sections with a series of various themes.

While music theory played a very unimportant role in the previous congresses of the IMS held in Basel, Utrecht, and Oxford, it was the subject of approximately one-third of the total 150 papers presented at this most recent congress, and discussion of music theory was in the foreground of all the activities of the congress. All three general subject areas and at least one of the panel discussions were dedicated to questions of music theory in the sense of the definitions formulated by David Kraehenbuehl: "...[music theory] is the formulation of laws regarding the practice of music..."[2] and "...the object of musical theory is not sound, not time, not human experience, but that particular conjunction of these that we call musical experience."[3]

It seemed therefore desirable to make a short report here ("...a theory forum to which brief theoretical observations or specific theoretical questions for discussion may be submitted..."[4]) regarding the theoretical section of the congress. It is not our intention to present here a complete report or critique of the entire congress or any of its parts. Since the papers presented at the congress will appear in a detailed published report, these lines will serve also as a notice of the papers on music theory which that report will present.

While the first subject area, "Categories of musical rhythm in European and non-European music," is in the province of so-called pure theory, the second, "Improvisation in the performance of 16th and 17th century music," is concerned with an aspect of performance practice, and the third, "Foundations and development of the concept of harmony," belongs to the history of music theory. The above-mentioned panel discussion in the area of music theory, under the direction of Prof. Jacques Chailley of Paris, dealt with the theme, "Revision of the traditional concept of tonality in the light of ethnological and historical musicology." The panel discussion led by Dr. Walter Kolneder of Luxembourg, "Dynamic and agogic in the music of the Baroque," might also belong to the field of music theory in our sense. Throughout, it was sufficiently evident what overwhelming significance the leading figures of modern musicology attach to real questions of music theory.

The two principal papers in the first general subject area dis-

2. Journal of Music Theory, I:1.
3. Ibid., II:1.
4. Ibid., I:1.

cussed "Basic questions in the study of rhythm" (Prof. Walter Gerstenberg, Heidelberg) and "Proposals for a theory of rhythm" (Prof. Marius Schneider, Cologne). These were followed by 14 discussion papers (readers from 9 countries on 4 continents) which augmented the basic theme from various technical, historical, ethnological, and stylistic viewpoints.

At the beginning of his lecture, Prof. Gerstenberg defined music as a "characteristic revelation [Offenbarung] of time." He indicated that the formulation of concepts had not kept up with the discovery of facts. He distinguished between epochal and personal rhythmic styles and observed that rhythm is more time-constructing (zeitaufbauend) than time-articulating (zeitzergliedernd) and that rhythm is more closely associated with non-musical spheres than melody and harmony which remain more closely bound to the world of sound. The well-known question as to whether rhythm could be considered the principal force in music was also raised. The reader closed his lecture with the assertion that in the case of rhythm also, integritas, proportio, and claritas were the basis of the beautiful.

Dr. Schneider proceeded in his paper from the thesis that the assymetrical in music is much older than the metrical and that the musical phrase, with all its assymetry, is the foundation of music. These fundamental musical phrases must be first catalogued according to their usage and by graphic methods of representation. In this way the question of which rhythms might be considered as vital could be raised. The reader also referred to the possibility of rhythmic modulation.

The second general subject area was opened with two principal papers: "Ornamentation in Monteverdi's shorter dramatic works" (Dr. Denis Stevens, South Croydon), and "Oriental influences in the improvisation practice of the 16th and 17th centuries" (Prof. Hellmuth Christian Wolff, Leipzig). These were followed by 11 discussion papers by readers from 9 countries on 2 continents.

While Stevens based his lecture primarily on Giovanni Luca Conforto's Breue et facile maniera d'essercitarsi a far passagi (ca. 1600), Wolff indicated—indeed not uncontradicted—that it was Islam, which had dominated Spain for centuries, that introduced the oriental art of improvisation and embellishment into Europe. As a unique example for all the ornamentation of the 16th century, the reader played a recording of the singing of a modern Jewish cantor.

Among the discussion papers, that of the 83-year-old senior musicologist of Germany, Max Schneider (Halle), was particularly noteworthy. In carefully chosen and incisive words, Dr. Schneider explained clearly the distinction between improvisation and embellishment practices in the 16th and 17th centuries, his discussion being occasioned by the failure in the past and still today to take proper account of this distinction in our editorial practices.

The third and last subject area was introduced by two papers, "The concept of harmony in the musical literature of Antiquity and the

Middle Ages" (Dr. Heinrich Huschen, Cologne) and "The sonal factor (Tonigkeit, Tonverwandschaft, Harmonik) in the construction of tone-systems" (Dr. Jens Rohwer, Neumünster), followed by 14 discussion papers (readers from 7 countries on 2 continents).

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RE: GERDINE'S GENERAL THEORY OF MUSIC

By Charles Burkhart

In my opinion, Mr. Leigh Gerdine's interesting theories as presented in the "Theory Forum" (pp. 104-106 of the April 1958 issue) fall short of being a "general theory of music" in two respects. The first of these shortcomings is the complete omission of any mention of rhythm. Would not a general theory of music deal with both of music's basic elements, sound and time? Second, the word "general" has always suggested to me a theory so all-encompassing that it would take into account the music of all times and places. But Mr. Gerdine's article leaves no doubt that he is referring to occidental music only. Should a "general theory of music" apply only to our own music or be general enough to apply to all music?

My only objection to Mr. Gerdine's article is his use of terms. His theory is not a general theory of music but a theory of the evolution of Western harmony.

In the preface to this same issue of the Journal, Editor Kraehenbuehl has given a very general theory of music in non-technical language: music is an expression in sound and time of human experience. Well aware that every music appreciation course starts out with a statement something like this, I suggest that if we must have a general theory, this is it. To a certain extent the statement can and should be elaborated in technical terms: one would first describe sound and time (as best one could!) and then show how the two combine to form "melody," i.e., music. But fixing the exact point at which sound + time = music as distinct from mere noise is a cultural decision which is determined by style preferences. People learn to accept that style which seems to them to best symbolize their "human experience." This decision is, of course, a relative, ever-changing matter, and for that reason stylistic peculiarities obviously have no place in a general theory.

BOOK REVIEWS

Edited by
Donald Loach

RUTGERS UNIVERSITY MUSIC DICTATION SERIES. (A Course in Basic Musicianship and Ear Training.) Prepared by A. Kunrad Kvam. Music Minus One, New York, 1957, 10 12-inch LPs, including Answer Booklet, $50.00, single volumes, including Answer Booklet, $5.95 per volume, additional copies of Answer Booklet, $1.00 each.

This set of records, prepared by the chairman of the music department of Rutgers University, will undoubtedly meet a long felt need. Such a project has been imminent for some time. As early as 1952 Prof. Kenneth L. Dustman of the Southwest Missouri State Teachers College prepared a set of records based upon composed music, and recently a similar cooperative effort was discussed by a number of colleges. Undoubtedly there is general agreement regarding the need for such a tool as shown by the wide endorsement and acceptance it has received to date.

The contents of the series may be summarized thus:

Vols. I-III. Melodic Dictation
Vol. IV. Intervals
Vols. V-VI(a). Triads
Vols. VI(b)-VII(a). Rhythmic Dictation
Vols. VII(b)-VIII(b). Melodic Dictation
Vol. IX(a). Scales
Vols. IX(b)-X(a). Two-part Dictation
Vol. X(b). Review of above elements

Acoustically the records are excellent. Both speech and music are clear, distinct and well-timed. The instruments used are the organ, piano, clarinet and violoncello. There are ample explanations on the records of both content and method. The various exercises are repeated, after suitable pauses, to enable the student to hear, identify and write what is played.

The knowledge required for Vols. I-V is the essential facts regarding the staff which are available on the cover of Vol. I. For Vols. VI-X a knowledge of note- and rest-values (given on the cover of Vol. VI) are necessary.

The series is designed "for use in music theory or basic musicianship courses in high schools, colleges, universities and conservatories," as well as "by the private music teacher, the professional and non-professional musician, and by church choirs and community singing groups," which includes practically everyone except the morose amateur who does not sing. In schools, the records are to be used either in class or as daily assignments to be completed outside the

classroom. As for the private teacher, he has "little time for instruction in the fundamentals of music, and in particular, in the giving of music dictation." It is suggested that this lack may be supplied by assigning the records as part of the student's home work. In addition, musicians in general, either individually or in groups, may use the records as a means of improving their sightreading and musicianship.

An evaluation of this series is difficult, especially in view of its admirable objective and careful preparation. Yet it cannot be accepted prima facie. Both its philosophy and methodology demand critical scrutiny. Perhaps the best basis for appraising it is by comparing the use of the word musicianship in the subtitle of the series and in a recent bulletin by the National Association of Schools of Music entitled Basic Musicianship Standards. Abstractly, musicianship may be defined as the aggregate of individual aptitudes, insights and skills in respect to music. Concretely, musicianship is concerned with the development of skills and insights related to the organization or performance of music. The primary basis of such development is aural sensitivity, and hence the importance of the Rutgers series. Once the need is recognized, two major questions arise: what is the nature of the material? and how is it used? The answers are simple: the series uses artificial exercises for both drill and instructional purposes.

As regards materials, the NASM bulletin sets minimum theory standards in terms of musical excerpts — a practice consistent with present pedagogical trends. The difference in material between the bulletin and the records indicates a significant difference in philosophy. Furthermore, the use of the records for both drill and instruction raises problems about the nature and function of drill in relation to learning. Today many educators believe that the best teacher of music is music itself,[1] and hence that both instructional and drill material should be based on living music. Furthermore, it is held that drill is essentially a clarification of learning and hence follows rather than precedes it. Drill per se has little place in modern education: it is a corrective rather than a learning activity.

Such criteria highlight the shortcomings of these records. The material used is unmusical, or rather non-musical, since it is concerned solely with mechanical problems. Alas, only geniuses can write musical exercises, e.g. Bach, Chopin or Bartok in contrast to Czerny; but all composers have written some music that might be used for educational purposes. However, music is a complete entity which loses its meaning when dismembered into melody, intervals, triads and rhythm. Drill in these components should follow the total musical experience — not precede it. In fact it is doubtful whether recognition of them in isolation promotes true musicianship since music results only from their combination. This series of records stresses the elements of music, but never music itself.

Space does not permit a full discussion of the methodology used,

1. For the relation of theory and practice see Walter Piston, Harmony, pp. 1-2.

but a few points may be noted. For example, in melodic dictation little emphasis is laid upon hearing "phrase-wise" or upon developing the students' tonal memory. The tune America is segmented thus: "My country 'tis of thee, Sweet" which hardly makes sense, either musically or grammatically. The practice of naming the first tone in all melodic dictation is questionable, as is that of writing each voice separately in the two-part dictation. Only the melodic material is within a tonal framework; each interval and chord is heard independently, i.e. without context. Furthermore, the level of aural difficulty varies considerably, and the material lacks interest because it has no musical content. Composed music would do the trick much better. Considerably more material would be necessary if the series is to be used continuously, since familiarity robs the records of their value. [Additional, more advanced series are in preparation. Ed.] Finally, the chief emphasis throughout is upon the recognition of details — not upon their relationship to a meaningful musical whole. This is a serious defect since one of the stated objectives of the series is musicianship. Trite though it be, the whole is greater than the parts — and only the parts are stressed in this series.

To summarize, the RUMDS is a conscientious effort to meet a real need. Its value should be judged in terms of its ability to develop intelligent aural sensitivity to musical wholes rather than recognition of unrelated parts. The term basic music or musicianship, with its new implications, appears to be superceding the older concept of music theory, at least for instructional purposes; but a change of terminology means little if the content remains unchanged. Basic musicianship implies a concern with practice rather than with theory, a primary interest in the whole — not in the parts, and a structural understanding of living music rather than of dead exercises. Musical growth is not mechanical, and it cannot be promoted by mechanical means.

The wide acceptance accorded this series is an index of the need it is designed to fill. It is a new tool for learning and deserves recognition as such. Undoubtedly the tool will be improved by a critical appraisal of its function. At present it is a boon to the poor teacher and a spur to the good one. In the broadest sense it will achieve its goal if it truly cultivates "the listening ear."

HOWARD A. MURPHY

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HARMONY FOR THE LISTENER. By Robert L. Jacobs. Oxford University Press, New York, 1958, 180 pp., $2.90.

Robert L. Jacobs may be remembered for his short study of Richard Wagner. In it, he captured something of the spirit of the cultural climate in which Wagner was reared and showed an enthusiastic sympathy for the philosophies which embraced the erotic and exalted tendencies of this composer.

Harmony for the Listener represents an entirely unexpected ven-

ture on his part. His relish for the biographical would not have led us to expect such a diversion, were it not for his dedication to Workers Educational Association Classes in music upon which much of the contents has been "tried." From the material presented, and especially in its manner of presentation, it is easy to observe that Mr. Jacobs is a born teacher. Not only is an enthusiasm for his subject ever-present, but also he is adept at choosing the right word to describe an aural sensation. Most teachers of harmony will envy him this gift and many will realize that possibly he can thank the informal surroundings in which he works for his ability to accomplish this. This volume is subtitled "an unconventional textbook" and it is directed emphatically to the listener who, we must presume, is able to comprehend the notational symbols of music and no more. All in all, it is an interesting experiment.

From a conventional discussion of the harmonic series and its consonant implications, the author proceeds to examine "the qualities of intervals." His facile descriptive vocabulary plays a big part in this section. An octave "is as though a note were merely looking at its own reflection" and of the minor third he writes, "the quality of sadness generally attributed" to it "does not inhere in the interval as such but arises from its presence in a specific harmonic context."

How legitimate his technique in the initial stages is, will be a matter of opinion. To proceed from the known to the unknown is all very well, but to choose the melody of "God Save the Queen" as a jumping-off point when matters of tonality and the mental retention of a home key are being discussed seems a risky procedure. Most listeners are too aware of the harmonic associations of the melody to be able to give an objective opinion as to the tonal effect of the various phrase endings. And we all know the frustration of ending a melody on the tonic and yet leaving the impression that we are "in the dominant."

This is not to hold that there exists any ambiguity of key in this chosen melody, but merely to point out that the bitonal possibilities in a single line are so considerable as to warrant care when choosing, as an example, something in which our aural associations are strong and settled. For example, on p. 2 Mr. Jacobs quotes the first two bars and avers that it sounds incomplete; of the next two bars he writes, "the second phrase has an air of completeness"; and describing the fifth and sixth bars he adds, "similarly, even more so, the third phrase."

Naturally we agree with this. But would we agree if we were totally unfamiliar with this particular melody. At this stage of the book there has been no consideration given to rhythm or cadence harmony so that the author's conclusions are drawn, and intentionally so, from melodic evidence alone. It is the nature of the material used rather than the method which is in question.

Considerations such as this may seem petty, but they do raise doubts as to the efficacy of the method. Nevertheless, it is obvious that other, and new, tunes could be dealt with in a similar manner.

From the dominant seventh we are led to modulation, treated quite conventionally but with a lucid regard for the technique as it affects the listener. It does appear misleading to have fragments such as the following described as a "Change to the Key of A Minor." Surely no one hears it as such. Later he says that the function of chords such as this dominant "is not really to change key at all, but rather to expand the range of the original key," a much more apt comment. In fact, it is this latter type of common sense which marks much of what follows. The ease with which a minor key gives way to its relative major is described as a "constitutional tendency" of all minors.

The second half of this volume has two basic strengths. Firstly, its illustrations are from the works of the great composers and secondly, harmony, as such, is discussed only in its relation to particular forms, notably sonata-form. The better known masterpieces of Mozart, Schubert, Wagner, Brahms and Tchaikovsky are quoted in such a way as to encourage a sense of detailed aural perception on the part of the listener, but not to the exclusion of a more panoramic appreciation. The first movement of Brahms' Third Symphony has for long been a locus classicus of harmonic resource and it is given prominence here.

The one chapter on "Some Trends of Twentieth Century Harmony" with which the book ends might seem inadequate. But Mr. Jacobs has not intended an exhaustive coverage of the ground. He proposes to stimulate, rather than harness, the interest of the reader. His quotations are well chosen in this respect, because, in the main, they are from accessible works, and for all its brevity the essay does make an effort to isolate the aspects of contemporary technique which are more easily grasped. Some bitonality from the Rite of Spring and Peter Grimes, modal elements from Bartok, and a hint of 12-tone work from Schoenberg, may be sufficient to sow a seed of interest in the person whose musical experience has been confined to the restrictive orthodoxy of a traditional repertory.

The idea behind Harmony for the Listener is unusual. Whatever we expect from it, it is fair to say that we may be surprised to find it fundamentally quite close in scope and method to many books designed for the classroom. It is a worthy contribution to the ever-expanding literature of the music-lover whose contact with music is largely one involving style and meaningful structure, beauty of sound and interest of idea.

JOHN RITCHIE

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THEME AND VARIATIONS. By Robert Kelly. Wm. C. Brown Company, Dubuque, Iowa, 1958, 113 pp., $2.75.

Composition texts, like other utilitarian commodities, are perhaps best evaluated in terms of the results gotten from extended use. Nonetheless, the very nature of book-reviewing precludes little more than a reasoned guess at the judgment of this test-of-time. Accordingly, I must acknowledge here a limitation to methodological and theoretical considerations.

This book is striking in its very businesslike organization. Beginning with the "Theme," there follows a sequence of twenty-one "Variations" collected into three sections of seven parts each. Successively, the three divisions introduce a "species" treatment of two-, three-, and four-part counterpoint, using a 12-tone row as a cantus firmus.

Sandwiched between each section is an "Interlude," a free model written by the author for the analytical regard of the student, while the final section of four-part settings is followed by a rather ill-proportioned "Finale" — the three movement score of the author's String Quartet No. 2, also offered for the student's analysis. The "Theme," "Variations," and "Interludes," fill the first 61 pages. The string quartet consumes the remaining 52.

Mr. Kelly's use of the duodecuple approach is curiously limited in scope. The compositional process illustrated in the "free" interludes and the finale, as well as in the more didactic examples, does not differ fundamentally from late medieval or early renaissance technique. While the cantus firmus is a "composed" version of the 12-tone gamut, we are led to believe that the simple uniting of one or more voices with a "given" line will produce music. This, I grant, is one way. But I know of no other composer today, save Mr. Kelly, who entertains such a rudimentary notion of what composing within an imposed chromatic seriality is like.

In establishing the basis for adding a voice to a "theme" (a row whose first note must be repeated as a finalis), a traditional consonance-dissonance classification is given. Ignoring some earlier attempts to abolish the old absolutist conception of intervallic tension (Hindemith and Krenek), the author posits seconds, sevenths, and tritones in the "dissonant" camp.

According to the treatment here, dissonance is come by in two ways, melodic and harmonic. Melodically, a dissonance may occur as a passing tone, suspension, anticipation, or "free dissonance." Harmonically, we must assume that dissonance just turns up where the composer wills it, for no explanation of what makes a particular collection of three or more pitches dissonant can be found in the book. We cannot infer that a chord is dissonant if it contains dissonant intervals, for the augmented triad, by the author's classification of intervals, contains consonances exclusively, yet it is labeled dissonant (p. 26) when spelled enharmonically C-E-A^b.

Hindemith's system of interval and chord root analysis is offered as an analytical tool. Two exceptions are made, however, in that seconds and sevenths are regarded with tritones as "indeterminate," and no mention is made of the "guide-tone" analysis of chords containing tritones.

Since a tonal center is regarded in this work as the inevitable consequence of beginning and ending the lowest voice of a texture with the same pitch, since the row is offered as an additional "unifying element," and since any resultant structures are determinable as consonant or dissonant, we might assume that here lies an infallible recipe for mixing up batches of music that should please everyone.

Instead, I predict only some raised eyebrows. Anyone who is familiar with serial techniques as they are applied today will be shocked by the limited resources offered in this book. Adherence to the row and its derivatives is slavish in the "free" illustrations, as well as in the model exercises. To say that the row is a unifying force is to be euphemistic. The row has become a crutch. And on the other hand, student composers less inclined to the duodecuple approach will feel that the imposed 12-tone obligation substitutes dogma for discipline.

Textbooks are notorious purveyors of dead music. One simply does not expect little musical gems among the eight-bar illustrations of a harmony book. But we can wish for stylistic logic in any document of methodology. The wedding in this book of the duodecuple bias with more or less traditional harmonic-melodic concepts legalizes the birth of some unusual children. One might say that a few of the examples rendered are victims of stylistic "mixed dominance."

Patches of hymn-like triads move along in chromatic vagueness, ending, at times, with solid authentic or plagal cadences. After the introduction of dissonant chords in Variation VIII, some examples flaunt jangling dissonances in the midst of diatonic placidity. The effect is sometimes akin to what one might expect from a hymn defiled by notational errors.

All of the examples are certainly not badly written. As a matter of fact, some, like the second interlude, page 41, and Ex. 18(a), p. 21, reveal a consistency of style that is engaging. But several of the author's readymade illustrations divulge too nakedly the peculiar hodge-podge that can result from a mixture of row and half-hearted diatonicism.

The "rules" of the book are about what one expects from contrapuntal primers today, duodecuple or diatonic. Restrictions are set upon voice-leading, a balance of skip-step motion is advised, sequences are prohibited, melodic contour is briefly mentioned as a worthy object of concern. Banned at first, parallel fifths and fourths are later admitted on a restricted basis. Successive octaves and fifths approached by contrary motion are permitted without limitation. The book is quite free of pedantry or "musicologese" padding.

In view of this relaxed attitude toward "don'ts," rule 45 (p. 26) seems singularly expendable. It states in essence that the two upper tones of a three-part texture must each form a consonance with the lowest voice. Since such a disposition of tones has no necessary bearing on the creation of consonance or dissonance as such, I conclude that the rule is a mere vestigial remnant of so-called "16th-century style." The same principle is retained for the four-part settings.

There are rare typographical errors to be found. Most, like the misuse of a 5/8 signature for a bar notated in 5/16 (p. 40), are readily spotted for what they are. A few other errors are not so easily reconciled, and they could lead to wasteful discussion in the teaching situation. For instance, the root, d, given in an analysis of the minor sixth, $d\text{-}b^b$ in bar 4, Ex. 14(a), is impossible if the author's system of root-analysis is accepted. Likewise, the occasional "dissonance" labels given pitches that form relations which, if respelled enharmonically, the author would call "consonant," make one pause to wonder if Mr. Kelly accepts equal-temperament as a basis for the duodecuple technique. A diminished fourth (major third) in Ex. 17(a) that is marked as a dissonance illustrates this ambivalent regard for intervallic tension.

The author recommends his book for two kinds of students: the general musician who wishes to sharpen his understanding of contemporary procedures, and the "earnest student of composition." Since any student of the latter category can be expected to benefit in one way or another from almost any manipulative practice with tones, I am certain the book has value. As for the general student, I suspect that more could be gained from a careful reading of the old Willi Reich monograph on Berg's Wozzeck, or from a few intense sittings with Krenek's Studies in Counterpoint of eighteen years ago.

WILLIAM THOMSON

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THE SOCIAL PSYCHOLOGY OF MUSIC. By Paul R. Farnsworth. The Dryden Press, New York, 1958, 304pp., $4.50.

Ponder the substance of the psychology of music as a scholarly field. What, if anything, do psychologists venture to say about the meaning of music to the individual, the nature of its emotional impact, or the process of its creation? Do psychologists know anything of consequence that musicologists do not? The answer, regrettably from the standpoint of psychology, is no, and in great detail.

Farnsworth's new text summarizes over five hundred articles and books on the psychology of music. Many of these references go back to the 1930's, 20's, or before, to the days when the level of scientific sophistication and the standards of acceptability in psychological research were very low. One would not so much mind the absence of scientific rigor and the poverty of analytical technique if the studies were important and the results at least suggestive. But this is not the case.

The literature reviewed by Farnsworth is of the poorest quality. Admittedly unreliable tests of musical ability are described; compositions claimed by musical therapists to reduce anger or be reassuring before electroshock treatment are listed; even included is the fact that vocal music is never played in British factories because a tendency has been noted for laborers to stop work to write down lyrics they particularly enjoy; and so on.

Under these circumstances it is hard to see why any psychologist would attempt, save through devotion, a book on the psychology of music. No manner of thumping on a battered washtub will elicit pear-shaped tones.

Prof. Farnsworth further compounds his difficulties by adopting a theoretical position he regards as embattled and in dire need of defense. This position is set forth succinctly in the following passage (p. 58): "Many American laymen and psychologists are hard put at times to understand why musical theorists seem so blind to the importance to their art of the law of frequency, ignoring so completely the function of learning. The explanation appears to be that music theory stems pretty largely from European philosophy...long dominated by the great formalist Kant. This or that is so, said the formalists, because inherent in the stimulus configuration are the qualities that make it this way. The formalists ignore the possibility that reasons may lie in frequency of association, in cultural inheritance. The present author...feels that many, if not the majority, of explanations necessary for understanding the phenomena of music must be looked for in the habits of the listener, in what he has learned from his personal and cultural history." The word "social" appears in the book's title mainly to emphasize this point of view.

The above theme is reiterated throughout each of the ten chapters, variously dealing with scales, intervals, melody, music as "language," musical taste, musical abilities, and the applications of music to therapy and industry. The book is, in part, intended for an undergraduate course, and its style is appropriately simple.

This reviewer feels strongly that the whole attempt, while probably instructive for undergraduates, will have negligible impact upon music theory. To my mind, the trouble with Farnsworth's theoretical stand is that he is on the defensive when no defense is needed, but does not take the offensive where offense is needed. The cultural relativism of musical taste, both in time and space, is obvious. What so sorely needs illumination is how and why particular music enriches the musical taste of an age while other music does not; how some composers come to survive beyond the period of the first acceptance of their music; in short, wherein lies musical genius, whereof great music. Conversely, what characterizes mediocrity and short-lived reputation? One wants to study Marcello as well as Bach.

Surely it is necessary to examine the properties "inherent in the stimulus configuration." The author instead is content with questionnaire data and tabulations from symphony programs and encyclopedias

which show (very convincingly, by the way) how extremely sluggishly any list of honored composers changes with time. Undoubtedly the glue of social influence makes gummy and slow the acceptance of good composers whose works are at first irritating and the rejection of bad composers who please (much with composers as with politicians). But one still wants to know how to tell good from bad, and the author makes it seem merely a matter of public relations (p. 56): "Theoretically speaking, any sequence of tones could conceivably constitute a melody for some culture group. But at any one time and place only a fraction of the many possible will receive official approval. In spite of this, the nonconformist will persist in experimenting with unapproved patterns until, for him at least, these become melodies. The extent to which the radical can convince others that they should accept these sequences is a mark of his greatness."

Farnsworth, himself one of the most active members of the Division of Aesthetics of the American Psychological Association, is well aware that the Division is underpopulated, that a great deal needs to be done and that there is insufficient interest among psychologists in tackling the problems. He looks forward bravely to new developments. I will mention one or two areas where improvements suggest themselves.

In the section on the emotional meanings of music, the author presents a check-list method due to Hevner wherein the listener checks adjectives describing the mood of the music. The adjectives can be arranged in terms of two mood dimensions—happy vs. sad and vigorous vs. tranquil—as well as combinations of the two, e.g. exhilerated, plaintive, etc. The scheme is suggestively similar to Schlosberg's recent taxonomy of human facial expressions and to Osgood's three-factor system for the measurement of connotative meaning. These latter factors are good vs. bad, strong vs. weak, and active vs. passive. Whatever the direct relevance of these schemes for the domain of music, it is probable that mood can be described by combinations of very few dimensions, say three at most. The check-list technique is crude, and modern psychological scaling techniques could profitably be applied.

Much more interesting than gross affective connotations, however, are the fine details of musical syntax. The past ten years have seen the emergence of information theory and powerful electronic computers. The former suggests methods for analysis of the statistical structure of sequences of stimuli, and these kinds of statistical structures have already been programmed for computers which can "compose" passable hymns and nursery tunes. Another recent development is Chomsky's analysis of English grammar, offering a broader system for the study of sequences than does the usual information analysis.

Doubtless information-like measures appropriate to musical stimuli will soon arise; they will have to take into account both the listener's previous experiences (which determine what he expects to hear) and the structure of the composition. For it is the interaction of the two which determines the psychological effect. If and when such measures do arise, then progress in our understanding will be rapid.

We desperately need handles with which to get a grip on this field, and Farnsworth's book serves only to sharpen the need.

ROBERT P. ABELSON

Mr. Farnsworth's intention in writing this book was to "present... a coherent picture of the phenomena of the field, its major problems, and the solutions he deems most plausible" (p. vi). The ten chapters deal with such diverse topics as the psychology of scales, intervals and melody, the language aspects of music, musical taste and its measurement, musical ability and its measurement, and the applications of music to psychotherapy and to industry. To this reviewer, who is a musician, the book appears to be the work of a careful scientist. It is more than a report of the author's own experiments, for it draws on an impressive bibliography spanning more than six decades of research. The material is clearly presented with a minimum of technical jargon, and a glossary further facilitates the reading of the book by psychologists and musicians not entirely versed in each other's fields. The book is most conscientiously, but unobtrusively, footnoted; there are excellent indices and no serious typographical errors. Format and layout are handsome.

From the start the author emphatically disengages himself from the position of the "formalists," who look for unchanging, absolute laws governing music and its perception. He feels that "many, if not the majority, of explanations necessary for understanding the phenomena of music must be looked for in the habits of the listener, in what he has learned from his personal and cultural history" (p. 58). Though primarily concerned with Western serious music, he frequently calls upon the music of other cultures to show that notions about the universality of certain characteristics of our own music are not true.

In the course of his book the author calmly disposes of many myths long cherished by both musicians and the musical public. For example, he offers evidence for the following: most monotones can be cured; Negroes are actually not more sensitive to tone and rhythm than whites; taking marijuana does not heighten auditory capacities; the "true beat in music" (takt) has little association with the human heartbeat; the capacities for handling 2/4 and 3/4 time are not more "instinctive" than those for 5/4 and 7/4; great vocalists do not and did not sing pure, steady tones; we really do not prefer to do our musical thinking in terms of just intonation rather than equal temperament; piano students would better not practice one hand at a time; the public has little or no tendency to bestow most honor on those eminent composers who have been longest dead; likewise, there is no support for the notion that musicologists honor neither their contemporaries nor those recently deceased. For all these (and many more) statements the author documents the experiments in question and discusses their reliability.

Though Mr. Farnsworth makes a generally convincing case for

his relativistic position and for the validity of his cautious conclusions, objections might be raised to a few minor details. The reviewer was surprised that Mr. Farnsworth made no mention, not even a refutation, of combination- (or difference-) tones and their possible bearing on the psychological effects of intervals and chords. One wonders whether he conducted his experiment in the perception of the "pitch of intervals" (pp. 38-40) without taking this phenomenon into account. It was also surprising that the chapter on communication (Chap. 5) made so little mention of the attempts to explain music as a representation of motion.

Mr. Farnsworth has an able grasp of music theory. It was disappointing, however, to read (pp. 48-49) that it would be a forward step for music theorists to drop the consonance-dissonance dichotomy and replace it with a continuum. Surely this forward step has been taken. Also, an error apparently occurs on page 108 where reference is made to minor modes containing the "diminished third." Presumably "minor third" or "augmented second" was meant. However, these slight mistakes do not seriously affect the larger issues under discussion.

In the chapter on musical taste, Mr. Farnsworth's research techniques were twice put to uses which seemed rather unfruitful. Must a lengthy series of tests be run in order to discover that "the most honored" composers today are those "of the eighteenth and nineteenth centuries" (p. 128), or that "while the hierarchy of composer prestige is roughly similar from one [opera company or orchestra] to another, conductors, directors, critics, and perhaps others stamp their individualities on the programs" (p. 142)?

This heavily documented book does indeed present a coherent picture of the major areas of the field, but at the same time it reveals how little is definitely known about the deepest aspects of the psychology of music. As the author himself states in a section on the difficulties and limitations of psychomusical investigation (p. 7): "In many areas [the psychologist] can only chew along the edges...He cannot get his teeth into the meaty center of the problem."

CHARLES BURKHART

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AESTHETICS. Lectures and Essays by Edward Bullough. Edited by Elizabeth M. Wilkinson. Stanford University Press, Stanford, California, 1957, xliii, 158 pp., $4.50.

As the editor says in an introduction to this volume of selected papers, "the field [of aesthetics] is frayed and untidy at the edges, the ground in the middle inclined to give under the feet of anyone not possessed of the most lucid intelligence and the firmest convictions." It was Edward Bullough's purpose in his introductory course of lectures, offered at Cambridge in 1907 as the first of its kind in the University, to trim up the field and to map its extent. In his most famous essay "'Psychical Distance' as a Factor in Art and an Aesthetic Principle," it was his aim to plant one valuable foothold in the middle ground.

These papers of a self-styled "hobbyist" in aesthetics are brought together from British journals and private printings. Along with a biographical notice, a list of publications, and a sizeable commentary by Miss Wilkinson, they give a good view of the ideas and the influence of a modest, versatile thinker. Bullough was elected to the Chair of Italian in Cambridge a year before his death in 1934, but his distinctive fields went beyond linguistics to include art and architecture, psychology, and public service to British education. His interests, of a range essential to the student of aesthetics, were all brought to bear on this "hobby," and its fruits form a major fraction of his published work.

Bullough was interested in the new "psychology" and conducted numerous experiments in aesthetic values. Of these the most remembered is his analysis of color perception with its conclusion as to four basic types of attitude: the objective, the physiological, the reminiscent, and the mood-finding. As the Encyclopedia Britannica gallantly sums it up, "it seems, then, that our preference depends very much upon our attitude."

His enthusiasm for experimental aesthetics runs through the introductory lectures, suggesting directions to pursue the fugitive through the laboratory, the studio, and the auditorium or gallery—directions which have not proved as profitable as they seemed fifty years ago, though still as tempting. Far more reaching is his argument, with its antecedents to be sure, for the "aesthetic consciousness" as an attitude, a mode side by side with the other distinct forms of consciousness. Its domain is artistic creation, aesthetic contemplation, the objective work bridging the productive and the receptive consciousness, and finally the extension of this mode to life in general, culture.

"It is the concern of aesthetic theory and experiment to define and analyze aesthetic consciousness, to ascertain the conditions of its realization and the range and typical features of its occurrence." For the study of "experience," Bullough was convinced that the future of aesthetics lay in psychology. Against its disappointing results, the tables are presently turned as some living theorists of art, notably Suzanne Langer, are reconcerned with "properties," convinced that the future of aesthetics does not lie in psychology. The editor assumes the task of reconciling these oppositions and finds a key in the common assumption of the aesthetic domain as a distinct mode—of perception (Bullough); —of signification (Langer).

Bullough regretted that experimentalists are concerned more often with emotion and perception in general than with aesthetic emotion and aesthetic perception. And he repeats an ancient cry of the artist, now affirmed in his laboratory, that art may be prized for reasons "quite other than aesthetic." His contribution of a sliding scale of "distance" with which to discuss the maximum differentiations of aesthetic response in relation to the maximum differentiations of the artworks producing responses, with either or both involved in "distancing," is a contribution across the gap between psychology and philosophy, since it establishes a useful image of the relationship(s) between "experience" and "properties." In Feeling and Form, Mrs. Langer describes his

concept, or his metaphor, as "a philosophical asset."

The present availability of Bullough's most distinguished essay and the many enchanting though unconsummated ideas in the other papers are reason enough for this neat and carefully edited book. Despite the claim on the dustjacket, however, the "psychical distance" paper was reprinted in Rader's A Book of Modern Aesthetics, New York, 1935, 2nd edition, 1952.

JOHN WHITE

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ANNOUNCEMENT

VOLUME III, Number 1

Appearing in April 1959

SCHENKER'S CONCEPTION OF MUSICAL STRUCTURE by Allen Forte will present a review and an appraisal of the theories of Heinrich Schenker with reference to certain current problems in musical theory. The article will include materials from Schenker's most important theoretical work, Die Freie Satz, which Mr. Forte is currently translating for the first time into English.

THE ISAGOGE IN MUSICEN OF GLAREANUS will present a complete translation by Frances Berry Turrell of this musical primer of the Renaissance in which are contained succinct accounts of the tonal and rhythmic theories of the middle 16th century.

ON THE USES OF MUSIC THEORY: A FORUM will present a group of four papers describing the application of theoretical thinking to the practical musical problems of the composer, performer, musical layman, and music educator. These papers, read at the Western Division Conference of the MTNA in July 1958, are by Halsey Stevens, Stanley Fletcher, Leonard Ratner, and Eugene Weigel.

A BIBLIOGRAPHY OF EXISTING ENGLISH TRANSLATIONS OF SIGNIFICANT THEORETICAL TREATISES being prepared by James Coover, music librarian of Vassar College, will provide the first available guide to the works of those theorists which can be read in full or in part in the English language.

The BOOK REVIEWS and BIBLIOGRAPHY OF CURRENT PERIODICAL LITERATURE will be continued.

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